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Seyed Hossein Fazeli, Ph.D.

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Re-visiting Well-Known Techniques to Improve the Pronunciation of Segmental Features (and Venturing into the New Normal)

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This project aimed at improving students' pronunciation of segmental features through the use and activation of some learning strategies, including the systematic practice of transcribing, reading aloud and recording texts into phonemic symbols. The participants were two homogenous learner groups attending the 2nd year and doing English Phonetics II in 2017 and 2019 at Loutaif Institute in Orán, Argentina. The experimental 2019 group's performance was compared to the control 2017 group. The intervention focused on the implementation of written and oral home assignments in the experimental group as well as the teacher's instruction on learning strategies and informal feedback on the group's weekly-based performance. Both groups' performances were registered by the teacher in class. The data considered five indicators: attendance, written and oral home assignments, and written and oral mid-term tests. These indicators were described and analyzed in relation to the influence produced by the application of the aforementioned techniques through the use and activation of learning strategies and their influence on the pronunciation of segmentals while developing automaticity and autonomy. By the end of 2019, the results showed a significant improvement in students' performance. These techniques can now be implemented in the new normal by utilizing some ICT tools.

Keywords: Segmental Features, Phonemic Transcription, Reading Aloud, Recording, Learning Strategies, Autonomy, Automaticity

1. Introduction

Kelly (1969 in Celce-Murcia, Brinton and Godwin, 2016: 2) stated that throughout the history of language instruction, the teaching of pronunciation has been regarded as the 'Cinderella' area within the research field. However, since the late 19th century onwards, there has been a growing interest in this area. The pragmatic nature of this action-research project derived from my personal observation and analysis of my teaching practice. As Nunan points out "research is derived from a real problem in the classroom which needs to be confronted'' (2009: 18). Therefore, the starting point of this study could be placed in the subject English Phonetics II at Loutaif Institute in Oran, Salta, Argentina.

Far from discovering any new method or technique, this project revisits well-known techniques: phonemic transcription, reading aloud and recording the students' productions. Indeed, these techniques are implemented worldwide to teach pronunciation; however, it is only recently that they have been used with students attending a specific English Phonetics II course in the northwest of Argentina as part of a research project.

1.1. The Research Problem

English Phonetics II was an annual course that consists of three-hour classes on a weekly basis for around 30 weeks per year. It was taken in the second year of the English teaching training studies at Loutaif Institute. The classes involved theory and practice. There were different types of tests and different types of assignments to be done in class and at home, usually in a written format. Despite fulfilling certain requirements like attending the whole course and succeeding in the written part of the subject, many students tended to fail their oral performance in their end of term tests and final exams. In other words, the practical trigger for the research problem was the students' low performance in oral tests in the subject English Phonetics II.

Observing this situation in the subject under discussion, I persisted in wondering about ways to improve my teaching practice and, thus my students' learning. In my pursuit, I started pondering on facilitating opportunities to develop learning strategies and learners' autonomy to help them improve their academic performance, especially oral performance. The immediate change in teaching methodology was to include more oral practice in class but that was not enough due to the short amount of class time. Then, the oral practice veered in the direction of home assignments.

This study assembled the pattern of three specific techniques (i.e. phonemic transcritpion, reading aloud and recording) as home assingments along with the use and activation of learning strategies with the purpose of improving the participants' pronunciation of segmental features while developing their automaticity and autonomy. Even though the mentioned sequence of tasks was far from innovative because they are still widely used in Argentina and abroad, the novelty lied on the specific academic and regional context of Loutaif Institute, a state teaching training center, situated in Orán, a department in the northwest of Argentina.

2. Literature Review

As far as the research literature is concerned, the reviewed studies enrich our understanding of ways to teach pronunciation and improve oral performance achieving more or less success considering a variety of factors and techniques. However, none of the examined studies gathered all the features together that the current project deals with at the same time. Indeed, the studies involved one, some or many of the features that the current project deals with but not all together developed in an organized sequence in the given particular context.

Lintunen suggested that "phonemic transcription is an effective teaching method for foreign language learners of English" (2005:1) at advanced levels. He carried out the study on 34 Finnish first-year-students taking a course in English pronunciation. His conclusions asserted that the participants' oral and written performances were quantitatively and qualitatively related in the testing period. That is to say that those who better transcribed were the ones whose pronunciation developed the most during tests and the other way round. The tests reflected students' progress. Lintunen also attributed the effectiveness of phonemic transcriptions to the similiarities in the morphene-grapheme relationship between English and Finnish.

Hilaire (2014) explored the role of noticing in pronunciation learning and the tasks of reading aloud and recording were part of this case study. Kai – the only participant- made great progress in the accurate pronunciation of three specific phonemes between the pre- to the post- instruction when reading aloud. Hilaire (2014) concluded that the practice of these segmental features in context rather than in isolated exercises contributed to improve accuracy in pronunciation. Noticing played a significant role in learning the target segmentals. Actually, the researcher also highlighted that if a student did not pronounce well, the teacher should bear in mind that the learner may not be aware of certain phonemes and should draw attention to them instead of assuming that the student could not pronounce the segmental features because they were difficult. Scaffolding in instruction was a relevant aspect to be considered.

Scaffolding was also studied by Sardegna and Macgregor (2013). Their main goal was to empower fifteen graduate learners by instructing them on the use of pronunciation strategies and equipping them with the necessary material. Results indicated that teacher scaffolding greatly contributed to the students' improvement on accuracy and to the appropriate selection of tasks for self-improvement outside the class.

Flaco Garcia & Mosquera Perea (2014) did not accomplish positive results for their classroom project on the improvement of pronunciation through reading aloud targeted at 5th, 6th and 11th graders from two different public high schools in Colombia. However, the researchers focused their findings only on 5th grade class performance and detailed factors that hindered the development of the project. This class showed unwilligness to participate and had a very low level of English –less than basic. The class time was very limited (i.e. one hour a week) for the 35 participants to perform all the activities. Finally, the class lacked technological tools. They concluded that "no matter how hard we tried we did not find that students' pronunciation improved that much" (2014:1). Assessing the failure, they asserted that the technique of reading aloud was useful because it allowed students to practise but this technique did not work with this group. The researchers noticed that the participants felt demotivated for their poor level and discouraged after teacher's correction in front of the other students in class.

In 2014, Adrian's action research project tested the efficacy of a reading aloud task in the teaching of pronunciation. This study analyzed the reading aloud performance of twenty students in their first year of English Studies in the language lab at the University of Basque Country for ten weeks. On the one hand, the researcher concluded that the components of noticing, awareness and explicit instruction were effective and facilitated improvement in pronunciation after analysing the two recorded reading aloud tasks. On the other hand, the questionnaire resulted in the students' firm belief that reading aloud helped them improve their pronunciation. The research conclusions also supported the idea that explicit corrective feedback was beneficial for university learners.

Theodore Bratton (2019) carried out a case study based on the effectiveness of reading aloud on the development of segmental features. The project took place in Japan and the only participant was a Taiwanese student whose mother tongue was Mandarin. The emphasis was on the improvement of the Mandarin native speaker's production of English vowel sounds in the context of a private lesson. The results showed the subject's great enhancement at segmental and suprasegmental level by the end of the sessions of reading aloud accompanied with corrective feedback. In addition, this project resulted in boosting the participant's motivation.

Pérez (2015) examined arguments for and against the technique of reading aloud (RA) along with mental strategies and shared her experience with the implementation of this task in Phonetics and Phonology courses at UNCuyo and other institutions. She agreed with Birch (2007) who stated that those who had phonemic awareness could read better because they could connect sounds with symbols and attach meaning to sounds. She concluded that "if RA is to be used successfully, it needs to be used sparingly, sensitively and appropriately, with clear learning objectives, and should be regarded as only one of the many tools in a teacher's kit" (Pérez, 2015: 42).

As it has been previously observed all the aforementioned papers discussed one or more relevant elements for this paper. What is more, they paved the way for the theoretical framework underlying the sequence of the three specific techniques of transcribing texts into phonemic symbols, reading the texts aloud and recording them.

Theoretical Framework

The first step of the sequence refers to the written technique of the phonemic transcription (Schnitzler, 2014; Harmer, 2005; Lintunen, 2005) which makes specific use of the phonemic chart (Underhill, 1994). The information about segmental features that students already count with is part of the declarative knowledge (Anderson, 1983); which stems from attending the annual subject English Phonetics I in the first year of their teaching training track. This information entails theoretical grounds on segmental features (such as definitions, classifications, and descriptions of ways of articulation of phonemes) and starts with practice on phonemic transcription. The learners are expected to reinforce declarative knowledge and develop procedural knowledge (Anderson, 1983) which is directly related to how tasks are performed by means of the activation and implementation of learning strategies.

Secondly, the transcriptions play a significant role because they serve to associate phonemic symbols, normal spelling and actual pronunciation with the subsequent techniques of reading aloud and recording the transcribed texts. These last two techniques involve the actual oral performance. Then, these tasks developed in a continuum are expected to activate some learning strategies (Oxford, 1990, 2011; Cohen, 2007; Rost, 2011). In this specific case, the focus is on the memory, cognitive, metacognitive and affective learning strategies (Oxford, 1990; 2011) (see Figure 1) which contribute to the development of the tasks. Indeed, the metacognitive learning strategies are especially relevant because they allow the students to self-monitor and self-evaluate by noticing errors - Schmidt's Noticing Hypothesis (Schmidt, 1990; 2010) - and by re-signifying the role of errors (Corder, 1967). The higher the frequency of occurrences, the better for the students' development and improvement of the pronunciation of segmental features.

Finally, the recurrences of the tasks accompanied by a raising-consciousness process lead to the automatic processing of information (Anderson, 1983, Logan, 1997). In other words, recurrent practice leads to automaticity (Anderson, 1983; Logan, 1997). Automatic pronunciation of phonemes is one important objective of the activities, that is, that students could pronounce well without spending too much on analyzing or trying to remember the exact pronunciation of words. Then, home assignments intrinsically involve self-study and they are expected to develop learner autonomy eventually (Oxford,1990; Harmer, 2005). All in all, the expected outcomes are automaticity and autonomy in both pronunciation and learning practice.

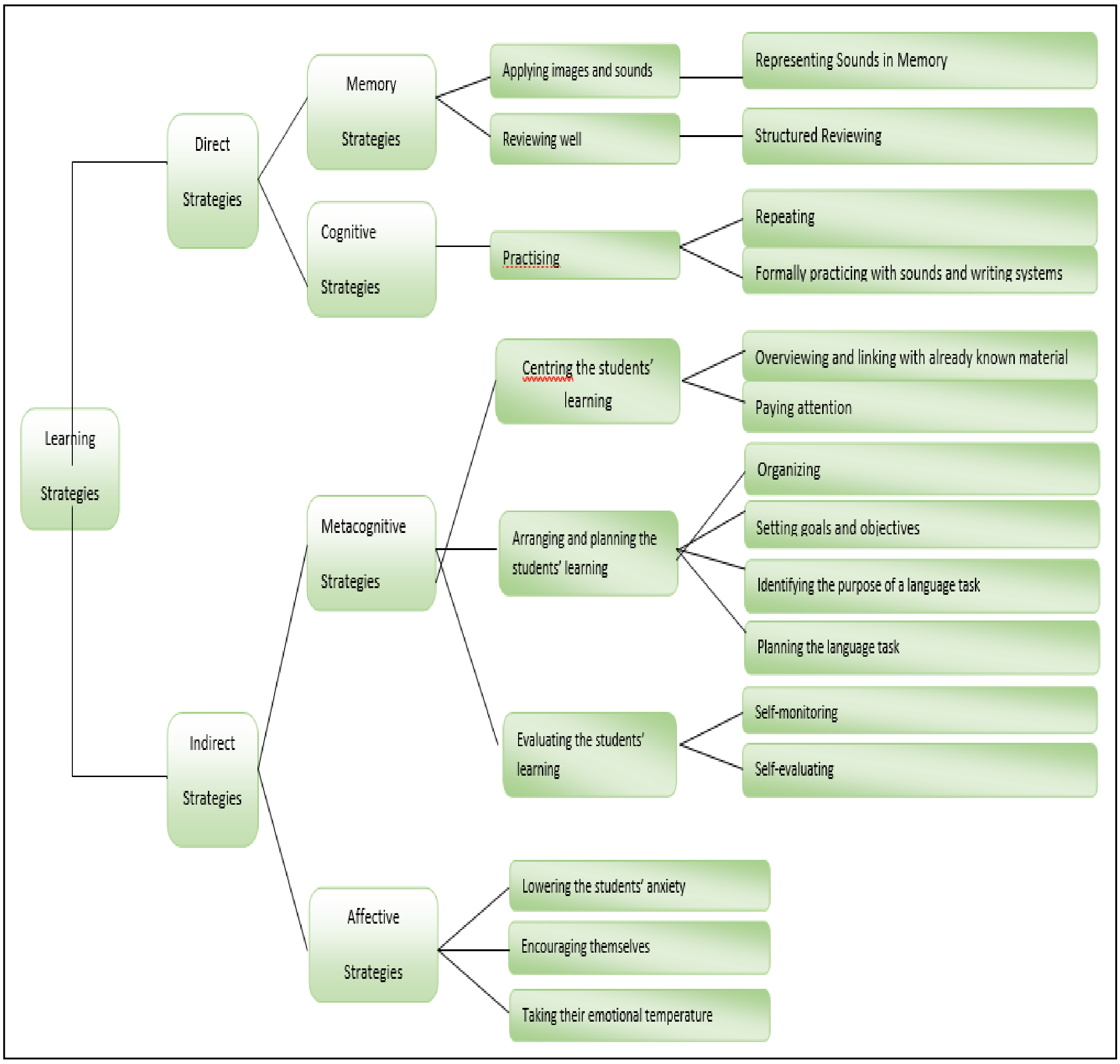

Learning Strategies
Direct Strategies
Memory Strategies
Applying images and sounds
Representing Sounds in Memory
Reviewing well
Structured Reviewing
Cognitive Strategies
Practising
Repeating
Formally practicing with sounds and writing systems
Indirect Strategies
Metacognitive Strategies
Centring the students' learning
Overviewing and linking with already known material
Paying attention
Arranging and planning the students' learning
Organizing
Setting goals and objectives
Identifying the purpose of a language task
Planning the language task
Evaluating the students' learning
Self-monitoring
Self-evaluating
Affective Strategies
Lowering the students' anxiety
Encouraging themselves
Taking their emotional temperature

Figure 1 Diagram of the Adapted Classification of some memory, cognitive, metacognitive and affective learning strategies

Taking into account all the aforementioned data, this study addressed the following general and specific research questions.

General Research Question

Did the regular practice of the patterned sequence of phonemic transcription, reading aloud and recording improve students' pronunciation of segmental features through the use and activation of some memory, cognitive, metacognitive and affective learning strategies in an English Phonetics II class at Loutaif Institute?

Specific Research Questions

A. Could the use and activation of some memory, cognitive, metacognitive and affective learning strategies influence, be observed and/or measured in the occurrence of learners' home assignments (i.e. the sequence of phonemic transcription, reading aloud and recording of texts)?

B. Did the regular practice of written home assignments (i.e. phonemic transcriptions) influence the practice of students' oral home assignments (i.e. reading aloud and recording) in the English Phonetics II class at Loutaif Institute?

C. Did the regular practice of written home assignments (i.e. phonemic transcription) improve students' results of their written mid-term tests and academic performance in English Phonetics II at Loutaif Institute?

D. Did the regular practice of oral home assignments (i.e. reading aloud and recording) done as a sequence of tasks improve students' results in their oral mid-term tests and academic performance in English Phonetics II at Loutaif Institute?

E. Did the regular practice of home assignments (i.e. the sequence of phonemic transcription, reading aloud and recording of texts) favour the development of learners' automaticity and autonomy in English Phonetics II at Loutaif Institute?

3. Method

Context: Instituto de Enseñanza Superior 'Dr. A. Loutaif' N° 6023' or Loutaif Institute is located in San Ramón de la Nueva Orán, Salta Province in the northwest of Argentina. English Studies were launched in 1997 and the teaching training program was divided into first, second, third and fourth year. There were three different changes of curricula in 2000, 2012 and 2019. Concerning the English Phonetics subject, the major curricula change took place in 2012 when the three Phonetics subjects were reduced to only two (i.e. English Phonetics I & English Phonetics II). In 2021, English Studies began a process of closure; however, the center still offers degrees in Spanish Language and Literature Teaching, Teaching at Primary level, Training in Public Administration or Training in Tourism.

Participants: The subjects of this study were students from English Phonetics II attending the 2nd year of the English teaching training career at Loutaif Institute in two different periods: 2017 and 2019. There were 25 students in 2017 and nine participants in 2019.

Despite their own peculiarities and differences in quantity, both groups shared enough similarities to make them comparable. Around 70% of the students attending both groups were females. The age range went from 19 to late 30s. There were a few older though. All of them shared the same theoretical background as regards phonemic information and the use of the phonemic chart or the International Phonetic Alphabet and transcriptions. Both groups shared the same instructor (and current researcher) in English Phonetics I and English Phonetics II, i.e. the evaluation criteria and the teacher's discretion as regards linguistic requirements were the same for both groups. Generally speaking, students attending 2nd year were deemed as highly motivated. All of them willingly entered first year, satisfied the requirements from first year and were eager to continue their studies considering that higher education is not compulsory in Argentina.

This study was descriptive and comparative. It observed, described and compared two homogenous groups of students in their personal development and achievements in the subject of English Phonetics II. The control group attended in 2017 and the experimental group in 2019. The last group experimented a series of written and oral home assignments along with intervention. Intervention could be regarded as the teacher's informal feedback and the students' use of some learning strategies when performing home assignments. The control group lacked this intervention. While giving the feedback, the teacher made the learning strategies explicit by writing them on the blackboard. Given the fact that the feedback was conducted individually, the teacher wrote down on the board her own suggestions and the students' suggestions upon the application of the strategies.

3.1. Data Collection and Procedure

The database for the study was collected by the teacher- researcher through weekly written reports on classes in English Phonetics delivered in 2017 and in 2019. The teacher gathered "impressionistic notes" (Oxford, 1990: 194) as well as structured data. These reports contained the following information per class and per year:

- Number of students
- Number of classes
- Number of written home assignments
- Number of oral home assignments
- Number of mid-term written tests
- Number of mid-term oral tests
- Percentages of attendance
- Percentages of delivered written home assignments
- Percentages of delivered oral home assignments
- Percentages of passed and failed mid-term written tests
- Percentages of passed and failed mid-term oral tests
- Percentages of students' academic performance by the end of each term and year
- Teacher's personal notes on the students' oral performance when listening to their oral assignments
- Teacher's personal notes on the students' weak and strong points in oral tests
- Teacher's discretion on students' overall performance

Within these reports, there were five main indicators that counted as five threads running through this subject and this study. They allowed to measure and determined students' performance in English Phonetics II. These indicators were:

- Attendance
- Written Home Assignments
- Oral Home Assignments
- Results of Written Mid-Term Tests
- Results of Oral Mid-Term Tests

These five requirements implied that the students had to practise, study and work inside and outside the classroom. The evidence was shown in the percentages obtained throughout the year. If the students did not reach the minimum percentage of class attendance, they would lose the right to do mid-term tests. If the students did not perform home assignments, they would also miss the prerogative of attending tests. If the students passed all the written exams but failed the oral tests, they could not succeed in English Phonetics II and thus, failed to reach the status of 'regular' student. If the students passed all the oral tests but failed the written ones, they would also fail the subject. Therefore, it was a question of reaching a well-balanced performance in the different indicators to succeed in English Phonetics II.

In English Phonetics II 2017, students were required to attend 70% of all classes during the year, to present 70% of the written home assignments, to pass two out of the three written tests and to pass the oral test in order to become 'regular' students. In 2019, learners were similarly requested to attend 70% of all lessons, to deliver 70% of written and oral home assignments and to pass 75% of all written and oral tests to obtain the status of ‘regular’. ‘Regular’ is a Spanish word that describes the academic status learners are supposed to obtain if they meet a number of requirements by the end of the year. This status is one of the students’ main goals since it allows participants to advance to the next course in their teaching training studies.

4. Overall Results and Discussion

These five indicators were regarded as reliable enough to determine success or failure in the students’ academic performance. Table 1 and the pertaining graph indicate that by the end of 2017, 48% of the control group became ‘regular’ students, 32% did not satisfy the requirements and 20% of the class abandoned the course at some point during the year.

Table 1 Overall Results of Students' Academic Performance 2017

Student Status	Student Frequency	Student %
‘Regular’	12	48%
‘Free’	8	32%
Abandoned	5	20%
Total	25	100%

Graph 1 Overall Results of Students' Academic Performance 2017

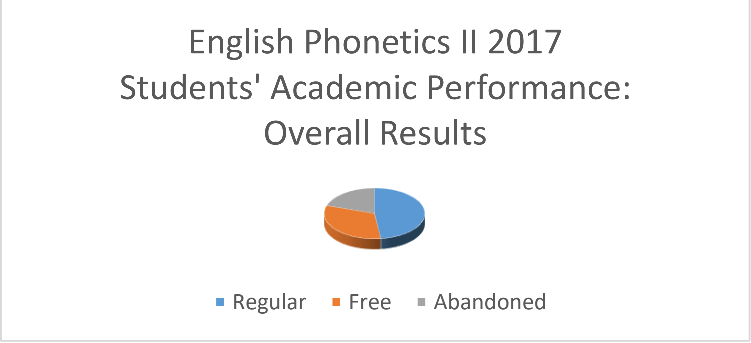
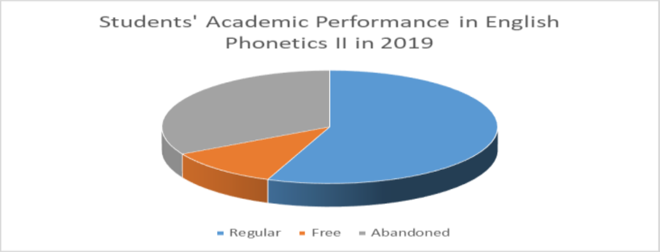


Table 2 and the corresponding Graph 2 show that 56% of the subjects of the experimental group attained the academic status of ‘regular’ student, 11% of the class did not meet the minimum requirements and 33% quitted the subject by the end of 2019.

Table 2 Overall Results of Students' Academic Performance 2019

Student Status	Student Frequency	Student %
‘Regular’	5	56%
‘Free’	1	11%
Abandoned	3	33%
Total	9	100%

Graph 2 Overall Results of Students' Academic Performance 2019



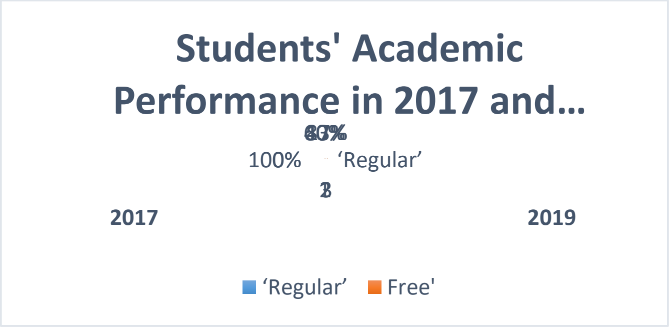
In both the control and experimental groups, there were a number of students who stopped attending classes by the end of the first quarterly period and they are represented in tables 1 & 2 and graphs 1 & 2 as the ones who abandoned. Indeed, those who quitted the course restrained themselves not only from coming to classes but also from performing assignments or sitting for mid-term tests in the second quarterly period in 2017 and 2019.

Therefore, it could be interpreted that those who actually finished the course were 20 students in 2017 and six students in 2019. These figures truly represent the 100% who wholly participated in class, did their homework, sat for mid-term tests and make-up tests (receiving the teacher’s intervention in 2019). Table 3 and graph 3 show and compare the results of both control and experimental groups without including dropouts. In 2017, out of 20 students, 60% of them reached the status of ‘regular’ students and 40% the status of ‘free’ students. In 2019, out six students, 83% accomplished the academic status of ‘regular’ students and 17% the status of ‘free’ students.

Table 3 Comparison of Overall Results of Students' Academic Performance in 2017 and 2019 without including dropouts

	2017			**2019**	
Student Status	Student Frequency	Student %		Student Frequency	Student %
‘Regular’	12	60%		5	83%
‘Free’	8	40%		1	17%
Total	20	100%		6	100%

Graph 3 Comparison of Students' Academic Performance in 2017 and 2019 without including dropouts



Before going any further, it is of outstanding importance to clarify that improving the pronunciation of segmental features meant to be able to perform well in oral mid-term tests. By improving pronunciation, learners were expected to read, pronounce and speak better.

For the English Phonetics II subject, the command of the oral performance was and is vital. Again, doing well in oral-mid-term tests meant that these students could fulfill the goals of the course thus reaching the academic status of ‘regular’ students. Those who could not manage oral skills would become ‘free’ students. In short, the tasks of phonemic transcription, reading aloud and recording were expected to affect learners’ performance in tests that eventually determined their final academic performance and academic status.

As regards the teacher’s role, I was expected to reflect upon my own teaching practice and take action. Firstly, the actions that were taken can be observed in the number of assignments which was doubled (from five assignments in 2017 to 13 assignments in 2019). Within these assignments, there was a difference between written and oral format. There was also the introduction of quarterly oral mid-term tests. But most importantly, the teacher offered informal feedback to each student when bringing their home productions to class. This informal assessment was meant to coach, to guide and to offer advice on the learners’ performance and their application of learning strategies by writing them down on the board without any decisive marking. These steps benefited both teacher and students as this intervention can be said to have boosted students’ improvement and as a result more learners reached the academic status of ‘regular’ students while less students became ‘free’. In brief, it can be stated that due to the intervention, the experimental group outdid the control group.

As far as attendance was concerned, both groups registered a marked tendency of high levels of attendance in the first terms of both years – an average of 90% of students attending above 70% of the lessons. Attendance became a problem by June, that is to say, in the second half of the year. In both learner groups there was a sharp decrease in attendance from the first term to the second term. In 2019, this drop was even sharper.

The causes for this drop are not discussed in this project but it did affect the learner groups’ performance. This reduction in attendance was directly reflected on home assignments and mid-term tests because class attendance was the way for the teaching learning process and exchange to occur and the only available way then and there to register the performance of assignments and to carry out tests. This decrease was directly observed in the percentages of home assignments and mid-term tests.

The indicator of ‘attendance’ is directly reflected on the indicator of non-attendance or ‘abandonment’. In 2017, 20% quitted and in 2019, 33% stopped attending classes (see Tables 1 & 2). It could be observed an increase in ‘abandonment’ from 2017 to 2019. Now, non-attendance could be attributed to a wide range of factors, namely academic, health or family difficulties, job opportunities, economic crisis, emotional or personal problems. Students who quitted classes were considered in the final figures because they also affected the other indicators such as the quantity of delivered home assignments and test results. Attending or not attending classes was crucial for delivering the assignments performed at home. By attending, students would hand in their homework, ask for explanations, talk about their difficulties, receive teacher’s feedback and do tests within the classroom.

Now, the indicators are to be discussed and related in the light of the research questions.

4.1. General Research Question

- ✓ Did the regular practice of the patterned sequence of phonemic transcription, reading aloud and recording improve students’ pronunciation of segmental features through the use and activation of some memory, cognitive, metacognitive and affective learning strategies in an English Phonetics II class at Loutaif Institute?

The outcome confirmed this premise. Here the focus was on the intervention performed in the experimental group 2019 in comparison to the lack of intervention in the control group of 2017. Comparing the overall results obtained by both groups by the end of each year, the performance of the pattern of phonemic transcription, reading aloud and recording did help and promote improvement in students' pronunciation in 2019. In fact, the students in the experimental group excelled in performance the control group. That is to say, that more students could meet the minimum requirements to reach the academic status of 'regular' which reinforces the hypothesis that the intervention proved beneficial. At this point there were two possible interpretations of the figures and both favoured the experimental group to a lesser or greater extent.

Considering the lesser extent of improvement, the overall results of students' academic performance (see tables 1 & 2) included every participant that began but may not have finished the course, that is, abandonment was part of the general outcomes. Having this into account, 48% of the control group gained the status of 'regular' students while 56% of the experimental group did it in 2019. Therefore, an improvement in academic performance was observed by the end of 2019. Even though this rise was not dramatic, the increase of 8% did exist.

Regarding the greater extent of improvement, the overall results (see table 3 and graph 3) dismissed dropouts due to the fact that this group of students quitted classes and prevented themselves from being involved in the teaching-learning process. At this point, the overall results show the experimental group significantly outdid the control group. In fact, in 2017 60% of the class reached the status of 'regular' students without any intervention. In 2019, a dramatic rise was observed when 83% of the students attained the 'regular' status after the intervention. This improvement meant that more students could read and speak more accurately and better by the end of 2019.

Other figures were also scrutinized in terms of those learners who got the academic status of 'free' student (i.e. those who failed to meet the minimum requirements to pass the subject). According to tables 1 and 2, 32% acquired the status of 'free' students and 20% quitted in 2017. In 2019, 11% of the class were granted the status of 'free' students and 33% abandoned.

In relation to table 3, there were 40% and 17% of 'free' students in 2017 and 2019 respectively. In 2019, there was a sharp reduction when only 17% of the class attained the status of 'free' students. This decrease in number of 'free' students can be taken as a gain because it meant that less students failed to perform the expected regular practice. In both interpretations, there was a *gained loss*, which was more noticeable in table 3.

In brief, there was a substantial gain in 2019 and the experimental group greatly outdid the control group. Not only more students (83%) performed better but also less students (17%) failed their oral performance. This improvement in academic performance could be attributed to the regular practice throughout the year.

4.2.1. Specific Research Question

A. Could the use and activation of some memory, cognitive, metacognitive and affective learning strategies influence, be observed and/or be measured in the occurrence of learners' home assignments (i.e. the sequence of phonemic transcription, reading aloud and recording of texts)?

The use and activation of learning strategies were observed and measured through the results obtained from students' home assignments. In other words, the existence and occurrences of these home assignments meant the use and activation of learning strategies. In this project, the students performed all the tasks at home, there were no witnesses but there were the results or the productions of that practice. The mental associations could not be visualized but they could be materialized by the learners' homework.

Due to the delivery of home assignments, students discussed how they used and activated the mentioned learning strategies while the teacher wrote them down on the board as part of her feedback. Both teacher and learners suggested the use of some memory, cognitive, metacognitive and affective learning strategies. In this sense, the teacher also took notes which could account for the observation and influence of the strategies on the students' performance of assignments. These notes opened the path to pieces of advice on the application of the mentioned strategies.

In brief, even though there was not a direct observation of the use and activation of these learning strategies, the effect of the occurrence and performance of home assignments could be observed and measured in students' learning outcomes and their own recounts.

4.2.2. Specific Research Question

B. Did the regular practice of written home assignments (i.e. phonemic transcriptions) influence the practice of students' oral home assignments (i.e. reading aloud and recording) in the English Phonetics II class at Loutaif Institute?

The practice of students' oral home assignments was influenced and depended on the regular practice of written home assignments. Only the experimental group's performance was considered in this question because there were no oral home assignments in 2017. The percentages obtained from the regular practice of written and oral home assignments were consistent in both terms in 2019. In the first quarterly period, 78% delivered most of the tasks, 22% handed in more than half activities in both the written and oral format. In the second term of 2019, 56% performed most of the assignments, 11% did more than half of the assignments in the oral and written form - 33% were absent. In both terms, the percentages obtained from the regular written practice matched the percentages from the regular oral practice. Therefore, both practices directly affected, influenced and depended on each other.

Even if learners could perform written and oral assignments separately, this was not the case in this project based upon the matching data. For Lintunen (2005), phonemic transcription enhanced students' pronunciation which happens to back up the premise under discussion. Just as Lintunen's results that showed that "the subjects' performances in the pronunciation and transcription tests were both qualitatively and quantitatively related" (2005: 4), the same situation took place for the experimental group. Now for the sake of improving students' pronunciation of segmental features, both types of tasks (written and oral) complemented each other and led to the other.

Indeed, the practice of transcribing texts influenced reading aloud and recording those texts because while performing the assignments, students were guided to raise phonemic awareness (Perez, 2015; Alderson, 2005; Stanovich 2000), to notice (Schmidt, 1990) mispronounced phonemes, to monitor themselves and learn from their own errors (Coder, 1967). The idea of transcribing a text using phonemic symbols allowed students to gain certainty about the pronunciation of the text (Harmer, 2005; Underhill, 2005). Once, they had a general idea of the pronunciation of the text, then, the recording occurred.

4.2.3. Specific Research Question

C. Did the regular practice of oral home assignments (i.e. reading aloud and recording) done as a sequence of tasks improve students' results in their oral mid-term tests and academic performance in English Phonetics II at Loutaif Institute?

As far as oral practice is concerned, only the experimental group was considered in this question because this was the group that underwent oral home assignments and oral mid-term tests each quarterly period. Just like the aspect of written practice in tests, oral mid-term tests included practice and theory, not only reading aloud. That is to say, students were asked to answer theoretical questions and read texts aloud in tests while the oral practice entailed reading aloud and recording transcribed texts. It would have been better to assess only reading aloud because the practice was based upon this. This can be considered another limitation of project. However, the study acknowledges the overall results of oral mid-term tests, not only the reading aloud part.

In 2019, the participants - who regularly attended classes- were also actively involved in the development of oral assignments and finally reached the status of 'regular' students. In the first quarterly period, all the class fulfilled the oral assignments but only 66% passed the first mid-oral test. In the second quarterly period, 67% performed their oral homework, 44% passed this second test and 33% were absent in the term. Later, those who sat for the oral make-up test obtained a passing mark.

In the overall results, 83% of the experimental group succeeded the oral practice (irrespective of class droppers) and were more successful than the 60% of the control group (see table 3).

4.2.4. Specific Research Question

D. Did the regular practice of home assignments (i.e. the sequence of phonemic transcription, reading aloud and recording of texts) favour the development of learners' automaticity and autonomy in English Phonetics II at Loutaif Institute?

The occurrence and delivery of home assignments served as evidence to acknowledge that students intended to develop responsibility (Rost, 2011) and did their homework at first hand. According to the theory, automaticity is an aspect that requires time, effort, practice. Both autonomy and automaticity are part of a process that evolves over time (Logan, 1997). The fact that students handed homework in in class, i.e. the activities were being done and the learning strategies were being used, indicated that both automaticity and autonomy were in the process of occurring (Anderson, 1983).

When the assignments were delivered, the teacher registered the realization of homework and took impressionistic notes on the individuals' performance. The instructor kept records and made observations on the students' progress, i.e. on levels of automaticity reached by the participant, for example on the quality of errors on segmental features. Autonomy was more limited to the student's ability to develop their own ways of learning. This could be seen when they offered suggestions on the use of learning strategies to the teacher. These instances served as evidence to clarify how deeply involved and autonomous these students were in their own learning process.

5. Conclusions, Limitations and Implications

The **findings** of this research paper can be summarized as follows:

- The intervention of home assignments (phonemic transcriptions, reading aloud and recordings), oral mid-term tests and teacher's informal feedback did improve the academic performance of the experimental group in 2019 in comparison to the control group. There was a major gain because 83% of the participants in 2019 reached the academic status of 'regular' students whereas 60% of students reached this status in 2017. The former mentioned class outdid the latter one.
- There was also a decrease in the percentages related to those who attained the academic status of 'free' students. In 2017, 40% of class failed the course while 17% of the experimental group did it in 2019. This meant that less subjects were unable to handle the minimum requirements of attendance, assignments and mid-term tests. And it also meant that more students benefited from the 2019 intervention.
- There was an existing connection between written home assignments (i.e. phonemic transcriptions) and oral home assignments (i.e. reading aloud and recording transcribed texts). At a superficial level, the students clearly read and recorded the texts already transcribed in phonemic symbols. At a deeper level, the written practice contributed to the development of the oral practice. While performing both assignments, students activated memory, cognitive, metacognitive and affective learning strategies. Therefore, it can be stated that written and oral practice were "both quantitatively and qualitatively related" (Lintunen, 2005: 4) in this project.
- The use and activation of some memory, cognitive, metacognitive and affective learning strategies could be observed not only through the occurrence and delivery of students' home assignments but also and mainly through the teacher's feedback. Here, the instructor registered on the board the strategies that were used and suggested by the students themselves when discussing homework and giving individual and personal feedback. By the end of the feedback, there was an available list on the blackboard to be taken into consideration by the students.
- The teacher's oral and informal assessment positively affected students' performance because this feedback allowed students to be mistaken, to take advantage of the errors, to discuss the application of learning strategies, to receive guidance and advice rather than a mark. This feedback was performed individually and made explicit the application of learning strategies on the board. Here the teacher kept impressionist records on students' performance where she noted down the realization of the tasks and the students' progress.

Up to this phase, these results could be regarded as not conclusive due to the fact that this was the first stage of a larger project. It was the starting point for further research.

5.1. Limitations of the study

- Observations and record keeping are valid tools to collect data but there are many other ways that can be used. As it has been established, this is the first phase of a larger project and future phases are likely to implement SILL (Strategy Inventory for Language Learning) developed by Rebecca Oxford (1990), videos, interviews - to mention just a few- as methods or techniques for data collection.

- Oral mid-term tests, recordings and phonemic transcriptions were limited to the teacher's impressionistic or structured notes. In other words, the students' productions were available only at the moment of delivering them in the classroom but not for further analysis. This should be fixed in the forthcoming stages of this research.
- Written and oral tests included not only phonemic transcriptions and reading aloud but also other theoretical and practical sections. Tests should have been restricted to the practice of transcription and reading to observe and measure if they directly affected each other. See a sample of a written mid-term test in the Appendix.

5.2. Implications

By 2017 and 2019, the teaching learning process was mainly conducted within the classroom; that was the known way and for many of us the only way to carry out this process. Nowadays, the world wide known sanitary situation about Covid-19 along with the extended periods of quarantine have nurtured online versions of delivering classes in Argentina and in most of the countries. Of course, this has also opened the spectrum to a hardly explored territory for many of us. The type of assignments required in this study could be improved due to having many other technological devices and virtual platforms at hand that teachers and students have been suddenly and urgently encouraged to use and gain the greatest possible advantages from them. Indeed, these new ways would be part of another project or another phase of this same project.

Considering the online versions, a possibility could be peer appraisal and collaborative work within the context of virtual platforms. Another online possibility could be a twist in the type of assignments. The ones required in this study could be adapted and tailored due to having many other technological devices and virtual platforms at hand. As a matter of fact by mid 2020 and 2021, the above implications were put into practice with the use of the following free and public websites.

5.2.1. Venturing into the new normal

To practise transcription, students were recommended to use the following pages:

- https://tophonetics.com
- https://glotdojo.com/phonetic
- http://www.photransedit.com/online/text2phonetics.aspx

Students are advised to use these sites although phonemic symbols should also be revised because some do not match Underhill's chart or IPA. Students can also manage to listen to the transcriptions at different speed levels.

To practise listening, students could surf:

- https://www.esl-lab.com (to listen and perform multiple choice activities)
- http://radio.garden/search (to listen to radio stations from around the world)
- https://www.cambridgeenglish.org/learning-english (to listen and perform activities)

To practise recording yourself, students are recommended to explore:

- https://vocaroo.com
- https://online-voice-recorder.com

To conclude, I agree with Pérez (2015) that if reading aloud is to succeed, it requires to be used sensibly, properly with clear learning aims, it should be considered as one of the many resources from the teacher's part (2015: 42). Therefore, and following Miroslav

Pawlak and Magdalena Szyska’s (2018) claim, it is necessary to explore strategy use as another resource to be used in the classroom. Cohen and Macaro claim that there are no correct or incorrect strategies but there is a strategy that is more appropriate for a specific student, for a specific task and for a specific aim (2007, 153). Now, even though there are probably many other strategies or ways of improving students’ pronunciation of segmental features, this research paper establishes the way I (the teacher /researcher) found more appropriate for my students seeking to meet their linguistic needs in the time allotted and satisfying the needs of the subject matter. In short, my way is directly related to the use and activation of some memory, cognitive, metacognitive and affective learning strategies through the patterned sequence of phonemic transcription, reading aloud and recording in my English Phonetics II class. However, the new normal encouraged and still encourages us to venture beyond all the unveiling possibilities to come.

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Appendix

A sample of a written mid-term test of English Phonetics II from 2019 at Loutaif Institute.

English Phonetics II (2019) Loutaif Institute N°6023

Student's Name: ____

Written Mid-Term Test

A. Write the following extract in normal spelling.

// wen aɪ lʊk bæk ɒn maɪ ʧaɪldhʊd // aɪ wʌndə haʊ aɪ sə ˈvaɪvd ət ɔːl // ɪt wɒz əv kɔːs / ə mɪzərəbl̩ ʧaɪldhʊd // ðə hæpɪ ʧaɪldhʊd ɪz hɑːdlɪ wɜːθ jɔː waɪl // wɜːs ðən ðiː ɔːdɪnərɪ mɪzərəbl̩ ʧaɪldhʊd ɪz ðə mɪzərəbl̩ aɪrɪʃ ʧaɪldhʊd / ənd wɜːs jet ɪz ðə mɪzərəbl̩ aɪrɪʃ kæθəlɪk ʧaɪldhʊd //

B. Read the following utterances. Rewrite them using Brazil's system. Predict the use of tones and justify the use of 3 (three) tones and prominence.

Cathy: I know he is married.

Jane: That makes you the other woman.

Cathy: I am not the other woman, am I?

Jane: Well… when did you meet him?

Cathy: Last Christmas! I remember we were next to the tree.

Jane: He was probably not alone then!

C. Listen and mark the tones (taken from English Pronunciation in Use Elementary by J. Marks CD D Track 26)

A. // allRIGHT?//
B. // YES //
A. // not NERvous//
B. // a BIT //
A. // don't WOrry // it'll be FINE //
B. // i HOPE so //
A. // RIGHT // let's START // are you READy//
B. // i THINK so //
A. // OK // the first QUEStion IS ….// WHAT's your NAME //
B. // my NAME? // it's … JACK JONHson//
A. // that's RIGHT// well DONE // DI fficult? //
B. // WELL// not TOO bad//
A. // RIGHT// the SEcond question is…… what's 37,548x7,726? //
B. // WHAT//

D. True or False? Justify if False. Enlarge the idea if true.

1. Syllabic consonants occur in syllables that contain only consonants.

2. Intonation is significant, systematic and characteristic.
3. Intonation can be used to clarify the speaker’s message only by means of Key.
4. Open listings have a specific number of items.
5. Pitch is expressed in the same way in every individual.

E. Listening Comprehension. For speakers 1-5, choose which of the subjects (A-F) the people are talking about. There is one extra subject which you do not need to use. (taken from Upstream B2+ Student’s Book by V. Evans & B. Obee – CD 5 Track 7)

A. Communications
B. The Economy
C. Travel
D. Health
E. Entertainment
F. Shopping

Speaker 1 ☐
Speaker 2 ☐
Speaker 3 ☐
Speaker 4 ☐
Speaker 5 ☐

An Investigation of Education for Sustainable Development Competencies: A Case Study of GFP Teachers of University of Buraimi

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Education for Sustainable Development (ESD) is a kind of education that has recently gained international prominence for solving many sustainability challenges. The current quantitative research seeks to investigate the University of Buraimi General Foundation Program (GFP) teachers' education for sustainable development competencies and their aspects. It aims to answer two questions: What education for sustainable development competencies do the GFP teachers at the University of Buraimi have? And what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess? This research is significant, as it will help all stakeholders evaluate the current teaching competencies of education for sustainable development that in-service teachers have and how to develop them to achieve the main plan of education for sustainable development by 2030. A total of twenty GFP teachers participated in the current study for the academic year 2022–2023 at the University of Buraimi. They were selected using a convenience sampling procedure. One electronic questionnaire was used to collect data. The Statistical Package for Social Science (SPSS) software (version 23) was used to analyze the data. Results show that GFP teachers' ESD competencies are higher than their transversal competencies and science education competencies, respectively. They further show that GFP teachers are more competent in raising students' environmental awareness, putting an emphasis on intellectual development, and thinking about the effects of their behaviors on their countries and the world than the rest of the current research competencies' aspects. The current research implications and future research avenues were also discussed.

Keywords: Education for Sustainable Development (ESD), Sustainable Development (SD.), competencies, sustainability

1. Introduction

Education for Sustainable Development (ESD) is a kind of education that has recently gained international prominence in solving many sustainability challenges. It is the kind of education that responds to the world's needs, perceptions and conditions. It is the kind of education that emphasizes how local needs affect internationally. This education helps learners to acquire knowledge, skills, attitudes and values for a sustainable future (Agbedahin, 2019; Leal Filho, 2015). It helps them to take decisions and actions in the main local or global problems of the environmental, economic, and social dimensions to achieve environmental integrity, economic validity and cultural diversity respect. Significantly, this kind of education develops learners' experiences of lifelong learning (Agbedahin, 2019). Education is not only the domain that achieves a sustainable future. However, without teaching and learning for sustainable development, the goal of sustainability will not be achieved. Education for Sustainable Development (ESD) is the primary type of education that could develop sustainable practices for a sustainable society (Cifuentes-Faura, Faura-Martínez & Lafuente-Lechuga, 2020; Rafika, Rym, Souad & Youcef, 2016).

Sustainable Development (SD.) was founded in the 1980s by the World Commission on Environment and Development (WCED). It (1987, as cited in Agbedahin, 2019, p. 2) defined sustainable development as "a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs". To bring sustainable development to the educational setting, teachers must have some sustainability competencies (Cifuentes-Faura, Faura-Martínez & Lafuente-Lechuga, 2020; Rafika, Rym, Souad & Youcef, 2016). Education for sustainable development requires participatory teaching and learning methods which could be implemented in formal and informal education systems to help learners to take the responsibility to learn, reflect, change behaviors, and take action for sustainable development. Formal systems of education are systems which are based on defined curricula, and they are primarily in public and private schools. However, informal education systems are systems which are not based on structured resources like magazines, newspapers or journals (Agbedahin, 2019). Henderson, Michel, Bryan, Canosa, Gamalski, Jones and Moghtader (2022) demarcated sustainability competencies as the knowledge, attitudes and behaviours of doing something. Rafika, Rym, Souad and Youcef (2016) focused that the current professionals or the future ones should have the knowledge and skills for professional practices to achieve a profound transformation of education. Consequently, sustainability awareness and knowledge could be strengthened among learners. Cebrián, Junyent and Mulà (2020) defined teaching competencies of education for sustainable development as "the competencies that teachers and educators need to put in place in the educational settings in order to promote sustainability competencies amongst their students" (p. 2).

With the calls of the United Nations Educational, Scientific and Cultural Organization (UNESCO), the main agency for implementing and monitoring ESD around the world, for education for sustainable development application during the current decade, the main question that needs to be answered is whether teachers who are under the umbrella of higher education in Oman have the competencies for implementing ESD especially if the Omani higher education originally encounters many challenges to offer graduates who have the necessary competencies that the market needs. Ali, Al-Saadi and Scatolini (2022) stated that research studies showed that the universities and colleges in Oman failed to graduate students who are qualified for occupational requirements. Abasaid and Ferreira (2022) and Ali, Al-Saadi and Scatolini (2022) stated that although there are many attempts to reform higher education in terms of quality and quantity either in Oman or the Arab Gulf region to graduate learners with knowledge and skills needed in private and public sectors, graduate learners show poor academic and professional performances. According to them (2022), students lack knowledge and soft skills, such as critical thinking skills and problem-solving strategies. Rieckmann and Barth (2022) and Cebrián, Junyent and Mulà (2020) emphasized that there is a positive interface between learner's development competencies and educators' competencies. Consequently, it is necessary to investigate teachers' competencies, especially in education for sustainable development, as a step to successfully apply Education for Sustainable Development (ESD) in the educational field. In the research realm, most of the studies done in the Omani context were mostly for designing models of applying ESD, investigating teachers' or administrators' perceptions and attitudes toward applying ESD in general or for specific subjects, or investigating some goals of education for sustainable development. However, a dearth of studies has investigated teachers' competencies of education for sustainable development. Nikolaou (2021) emphasized that there is a need for research studies that investigate sustainable development in higher education in Oman, showing what has been realized, the main needs, and the main feedback. Similarly, in the research realm of other contexts, Henderson et al. (2022) stated that there is a need for research studies that foster the sustainability of learning in higher education. Daniali, Barykin, Khortabi, Kalinina, Tcukanova, Torosyan, Poliakova, Prosekov, Moiseev and Senjyu (2022) also asserted that there is a need for research studies on employees' competencies in various contexts. In a similar vein, Cebrián, Junyent and Mulà (2020) recommended assessing teachers' competencies development.

Therefore, the motivation of the current research is to investigate Omani higher education teachers' competencies for education for sustainable development. It aims to investigate the University of Buraimi General Foundation Program (GFP) teachers' education for sustainable development competencies and their aspects. This research is significant as it will help all stakeholders to evaluate the current competencies that in-service teachers have and how to develop them. It will help them to know how to design the programs for the professional development of in-service or pre-service teachers. This research could further help the directors of education for sustainable development for 2030 to evaluate the current needs of teachers. Therefore, the learning process could be developed even partially. The current research will answer two questions: What education for sustainable development competencies do the GFP teachers at the University of Buraimi have? And what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess? The competencies that the current research investigates are the ESD, transversal and science education competencies. The ESD competencies involve the ability of a teacher to raise students' awareness of the environment, foster their sense of belonging to it, analyze its issues, act and make decisions to solve these issues. In contrast, transversal competencies are the competencies which are about the ability of a teacher to promote students' reflection, responsibility, intellectual development, and attitudes toward social cooperation to solve environmental issues. However, science education competencies are the competencies which emphasize the ability of a teacher to observe and analyze the phenomenon scientifically, providing pieces of evidence, contrasting ideas and suggesting improvement actions. They further involve the ability of a teacher to provide appropriate explanations or predictions of environmental issues. The researcher expects that GFP teachers at the University of Buraimi do not have the competencies needed for education for sustainable development. This research is constructed to start with the literature review of education for sustainable development, and it will be ended with the research methodology, the results that were found, the discussion of the results and the conclusion of the study as a whole respectively.

2. Literature review

2. 1. Definitions

With the calls of UNESCO to apply education for sustainable development during the current decade and the challenges that Omani higher education originally encounters to graduate learners who are qualified enough for the market, the question that needs to be answered is whether teachers in the Omani higher education have the competencies for education for sustainable development. In literature, many researchers designed models of applying the ESD, investigated teachers' or administrators' perceptions and attitudes toward applying ESD in general or for specific subjects, or investigated some goals of education for sustainable development. However, there is a need for more studies that investigate teachers' competencies in applying education for sustainable development in the educational field. Nikolaou (2021), Henderson et al. (2022), Daniali, Barykin, Khortabi, Kalinina, Tcukanova, Torosyan, Poliakova, Prosekov, Moiseev and Senjyu (2022) and Cebrián, Junyent and Mulà (2020) asserted that there is a need of research studies that emphasize teachers' competencies of education for sustainable development or their needs in higher education.

Education for Sustainable Development (ESD) was defined as "an educational process characterized by approaches and methods aimed at fostering awareness about the issues pertaining to sustainable development (e.g., social, political, economic and ecological matters" (Leal Filho, 2015, p. 4). In addition, it was defined as "a capacity to think critically about what experts say and to test ideas, exploring the dilemmas and contradictions inherent in sustainable living" (Scharenberg, Waltner, Mischo & Rieß, 2021, p. 2).

On the other hand, competence was defined as a group of knowledge, skills, attitudes, motivation, and value systems to assist individuals in solving dilemmas in various contexts and performing tasks successfully (Rieckmann & Barth, 2022). Sustainability competencies are "a set of knowledge, skills, and values that are fundamental to ensure students’ capability to adapt to the complexity and uncertainty of sustainability issues" (Imara & Altinay, 2021, p. 2). The difference between sustainability competencies and ESD competencies is that the former is "the combination of cognitive skills, practical abilities, and ethical values and attitudes mobilized in a real situation or context related" but the latter is "the competencies that teachers and educators need to put in place in educational settings in order to promote sustainability competencies amongst their students" (Cebrián, Junyent and Mulà, 2020, p. 2). Rieckmann and Barth (2022) stated that ESD competencies are "a capacity to support the development of sustainability competencies through a range of innovative teaching and learning practices (p. 5). The current research follows the definition of Scharenberg, Waltner, Mischo and Rieß's definition of education for sustainable development and Cebrián, Junyent and Mulà's definition of ESD competencies.

2.2. Education for sustainable development competencies: theoretical underpinnings

Education for sustainable development competency was originally traced back to the Competency-based Approach or Competency-based Education. This approach was founded in the 1920s and used practically in the 1970s. The form of this approach is regularly updated. The vital notion of this approach is that with the openness of societies, increased informatization, and a dynamic environment, education should enable learners to solve dilemmas in unfamiliar contexts or situations. This approach aims to create a balance between general and professional education and the needs of society and the job market (Butova, 2015). It aims to make sense of the learning process by relating it to students' real lives. It aims to create authentic learning opportunities for students as a source of acquisition. It aims to present the prime core competencies that students must have after a learning process (Haddouchane, Bakkali, Ajana & Gassemi, 2017) and the way of implementing them at all levels of education (M. Makulova, Alimzhanova, Bekturganova, Umirzakova, L. Makulova, Karymbayeva, 2015).

According to the competency-based approach, both teachers and students have a role. The role of teachers is to organize the learning outcomes in the best way to bring students to the level expected. Teachers in the competency-based approach should provide learners with means that help them to learn. In addition, they have to facilitate knowledge rather than transmit it. They should encourage students to acquire knowledge. They should also encourage them to be creative. They have to ensure that the planning and organization of activities that students prepare are good and aligned with the objectives. They have to suggest ideas for them without any imposing. On the other hand, the role of students in the process of learning based on the competency-based approach is to suggest ideas. They must have the desire to know, learn, and organize the work by using new technologies and methods and looking for new information. They must mobilize the available resources to achieve a task (Haddouchane, Bakkali, Ajana & Gassemi, 2017).

The evaluation of learning in this theory is based on whether learners master competencies and prerequisite materials for achieving them. The mastery competencies were defined as the learners' ability to apply knowledge in real-life situations. In this theory, learners must have knowledge, skills, attitudes, values and behaviors to pass (Henri, Johnson, Nepal, 2017; Gervais, 2016). The purpose of this approach is not to rank learners but to help them learn how to accomplish a goal. It helps learners to escalate the probability of their success by providing them with instructional routes. The time and objectives are underscored in the competency-based approach. This approach highlights that learners' mastering of competencies could differ between students, but the objectives are the same (Butova, 2015). This approach could seem for learners, but it is also for teachers. As students' facilitators, teachers have to have specific competencies that help students to have the required skills that are necessary in this competitive world which was originally controlled by globalization (Takkaç Tulgar, 2020).

2.3. Past studies: a review

2.3.1. Overseas research studies

Ammoneit, Turek and Peter (2022) performed a quantitative research study to assess 100 pre-service geography teachers' competencies and attitudes towards the German ESD orientation framework to determine the needs of teachers in higher education. The main research instrument that was used to collect data was a survey. Results showed that the competence assessment was high. Teachers had high ESD-related professional competencies. Teachers were confident in content knowledge, and personal and social competencies. However, they needed to be more confident in their pedagogical knowledge. The results further showed that the semester number and school practice module played a vital role in developing these competencies.

In contrast, Moganadas, Subramaniam, Huey, and Bahaman (2020) conducted a quantitative research study on 169 educators at a university to measure their awareness of sustainable development economic, social and environmental dimensions. The research data was collected using online and offline surveys. Results showed significant differences in the level of awareness of sustainable development dimensions among educators. The educators had a high awareness of the social dimension, followed by the economic and environmental one. The needs and gaps of campus sustainability were also discussed.

Maidou, Plakitsi and M. Polatoglou (2019) accomplished a quantitative research study to report the knowledge, perception and attitudes of pre-service early childhood teachers at a university. Results showed that teachers had knowledge of the environmental aspects of ESD. However, they did not have knowledge of societal and financial matters. They thought that ESD was an important issue, but it should be included in the curricula. Consequently, their abilities to teach ESD will be developed in the future.

On the other hand, Cebrián and Junyent (2015) performed a quantitative research study on 32 student teachers to explore their perceptions of education for sustainable development competencies that have priority in ESD school projects. A questionnaire was used to collect data. Results showed that the acquisition of knowledge and the practical skills of nature and natural sciences were more important than the promotion of ethical values and positive attitudes toward sustainable development and the management of emotions. The study recommended that the existing frameworks should be more alive and integrated into the current teacher education curriculum to promote student teachers' awareness and their ESD competencies.

2.3.2. In the Omani context

Nikolaou (2021) performed a qualitative research study to identify evidence of innovation elements through implementing the ecosystem of sustainable development in a higher education environment. Semi-structured interviews and document analysis were the main research instruments. Results showed significant differences in the level of awareness between logistics faculty members. Results further showed that the minimal incentives and grants, the lack of tenure, the low level of cooperation in providing placements and internships, the slow internalization and the limited collaborations were some real reasons for not having the innovation elements in a sustainable development ecosystem in higher education. The study implications showed that there was a low level of awareness among faculty of pedagogical approaches to innovation. They further showed that government spending was very low in this domain and the industry was not ready for university business collaboration. Therefore, there were limited opportunities for putting theories into practice.

Al-Maamari (2021) accomplished a qualitative research study to analyze the perceptions of educators about citizenship and their practices of it. An interview was the main research instrument. Results showed that educators associated citizenship with patriotism. They associated it with their own personal vision of it. In addition, results showed that teachers had limited practices associated with citizenship education. They needed professional growth in citizenship development.

As it is evident in the literature, to the best of the researcher's knowledge, there are few research studies that are related to educators' competencies of sustainable development. Research studies in this research area are rare. It was clear that most research studies were on a small number of pre-service teachers of some subjects. The available literature partially discusses teachers' perceptions and awareness of sustainable development or some aspects of ESD competencies, knowledge, skills and values. However, it does not clearly present teachers' competencies and their aspects. Therefore, the current research will fill this lacuna, and it will investigate the educators' competencies in sustainable development, drawing a clear picture from the Omani context. It will investigate the University of Buraimi General Foundation Program (GFP) teachers' competencies of education for sustainable development and their aspects.

3. Research methodology

3.1. Research design and context

The current quantitative research aims to collect numeric data on the University of Buraimi GFP teachers' competencies of Education for Sustainable Development (ESD) and their aspects. The data are primary. They were collected by the researcher in the academic year 2022/ 2023 by using an electronic questionnaire.

The research was done on the General Foundation Program (GFP) teachers at the University of Buraimi, Sultanate of Oman. This program is designed to assist high school graduates in developing their English, computing, math and study skills before starting their specializations. Teachers in GFP have to prepare learners for the previous skills through three levels. The method of teaching at the University of Buraimi is the student-centred method. Teachers at GFP teach learners defined curricula, courses which were not prepared by themselves. The English courses' topics are friendship, art, special possessions, creativity in business, phobia, adventure, family, sport, finding the ideal job, creative thinking, making money, subway etiquette, the fat tax, the heart of a hero, what is your medicine? endangered cultures, sports and obsession, the consequences of fraud, exploring the red planet, language and power, careers of the future, ecotourism, museum and us, and is our climate changing? Math courses, nevertheless, focus generally on developing learners' understanding and skills of statistical concepts, and fractional and algebraic expressions. They further emphasize developing learners' skills in solving logarithmic, and exponential quadratic functions. Math courses at GFP also emphasize developing learners' understanding of the mathematical approaches and how to use them to analyze the main problems they face daily. The IT courses, on the other hand, emphasize the basic knowledge of information and computing skills. They focus on teaching learners the basic features of PowerPoint, Microsoft Word, and Excel. They focus on the fundamental computer network and computing and the fundamental computer network and file management. They develop learners' skills in using databases, the Internet and email. The study skills courses, in contrast, focus on developing learners' skills in time management, research, library, and presentation.

The study participants were twenty teachers. They have different degrees and years of experience. Table 1 shows these two characteristics in detail.

Table 1

Study Participants' Characteristics

Characteristics	Participants (T= 20)	
	Number (N)	Percentage %
Degree		
Master's degree in Teaching English to Speakers of Other Languages (TESOL)	8	34.8%
Bachelor's degrees in English and Cambridge Certificate in English Language Teaching to Adults (CELTA)	3	13%
Master's degrees in mathematics	2	2%
Master's degree in IT	3	13%
Degree in English for Specific Purposes (ESP)	1	3.4%
A bachelor's degree in education	1	3.4%
Other degrees of science	2	8.7%
Years of experience		
(1-5) years of experience	4	17.4%
(6-10) years of experience	1	4.3%
(11-15) years of experience	10	43.5%
(16-20) years of experience	5	21%

3.2. Participants and sampling

The General Foundation Program (GFP) at the University of Buraimi involves twenty-eight teachers. Table 2 shows the characteristics of the study's population and sample.

Table 2

The Characteristics of the Study's Population and Sample

Characteristics	Participants (T= 20)	
	Number (N)	Percentage %
Population Characteristics		
Total	28	100%
Males	14	50%

Females	14	50%
Sample Characteristics		
Total	23	82%
Males	9	39.1
Females	14	60.9%
Level one	7	30.4%
Level two	4	17.4%
Level three	1	4.3%
Levels one and three	1	4.3%
Levels two and three	2	8.7%
The three levels together	7	30.4%

The study participants were selected by using the convenience sampling procedure. This procedure was utilized because the current research had fewer rules to follow. Participants had merely to be teachers in GFP. The researcher utilized it because there was a need to find a readily available sample to perform the research. Selecting the participants was started after sending WhatsApp text invitations to the targeted sample of GFP. Those who showed that they wanted to participate in the study were sent the questionnaire link. The WhatsApp text was written and sent by the researcher. This way was utilized to ensure that the responses which would be received later would be from the target population (for more information, see the data collection section).

3.3. Research instrument

To collect data for the current study, one electronic questionnaire was employed. The electronic questionnaire was divided into four sections. The first section aims to collect demographic information of the participants, specifically their gender, level of education, years of experience, and the number level teachers teaching in GFP. The second, third and fourth sections aim to collect data on the participants' ESD, transversal and science education competencies, respectively. The current research 17-item instrument was designed with the help of Cebrián, and Junyent's (2015) prioritized list of ESD competencies based on student teacher's views and Chuliá-Jordán, Peña and Llinares's (2022) sustainability competencies map for university degrees in education. The current research questionnaire consists of a 5-point likers scale (1= strongly disagree, 2= disagree, 3= neutral, 4= agree, 5= strongly agree). It includes three subscales: ESD competencies, transversal competencies and science education competencies, respectively. The first subscale, ESD competencies, aims to measure teachers' competency of raising students' environmental awareness, fostering their sense of belonging to the environment, helping them to think about different scenarios to a situation or problem on a global and local scale, promoting their critical analysis of some phenomenon or subject where they could position themselves to argue for and respect different points of view, promoting their ability to act and make decisions, promoting their skills to collaborate in socio-educational actions as part of a cooperative community, including the participation of different stakeholders of sustainability, and promoting students' educational values oriented towards responsible and active citizenship. However, the second subscale, transversal competencies, aims to measure teachers' competencies in developing learners' habits and attitudes of transformation at the personal and community levels. In addition, it aims to measure teachers' competencies in developing learners' intellectual and practical skills to apply the transformation. The intellectual and practical skills are the skills of reflective practice where a learner analyzes a situation or a problem from different perspectives and areas, sets theories to solve the situation or problem, takes action to test them, and respects and values the diversity of biological, social and cultural issues. This subscale also measures teachers' competency in controlling their students' projects to be sustainable and helping them to have the commitment to apply them. On the other hand, the third subscale, science education competencies, aims to measure teachers' competencies to explain and interpret a phenomenon scientifically and identify appropriate explanations and predictions for it. It aims to measure teachers' competency to observe facts of a phenomenon and identify evidence and contrasting data of it. It further aims to measure teachers' competency to analyze the impact of human activities on the local and the global environment and suggest improvement actions. Items 1, 2, 3, 4 and 5 of the ESD Competencies Subscale were inspired by Cebrián and Junyent's prioritized list of ESD competencies based on student teachers' views. However, items 6 and 7 were inspired by Chuliá-Jordán, Peña and Llinares's sustainability competencies map for university degrees in education. On the other hand, items 1, 2, 3, and 4 of the Transversal Competencies Subscale were inspired by Cebrián and Junyent's prioritized list of ESD competencies based on student teachers' views. In contrast, item 5 was inspired by Chuliá-Jordán, Peña and Llinares's sustainability competencies map for university degrees in education. Nevertheless, items 1, 2, and 3 of the Science Education Competencies Subscale were inspired by Cebrián and Junyent's prioritized list of ESD competencies based on student teachers' views.

To measure the validity and reliability of the instrument, SPSS (Statistical Package for Social Science) software (version 23) was used. The Pearson correlation coefficient was used to ensure the research instrument's validity. Results showed that the instrument items correlation is highly significant (less than 0.05). Statistics showed that all the questionnaire items were valid. They were < .4438 (critical values for Pearson's correlation coefficient).

In contrast, Cronbach's alpha was utilized to ensure the research instrument's reliability. Results showed that the reliability coefficient of the research instrument was .983 (see table 3). This result indicates that the research instrument's reliability is excellent. Moreover, to ensure the reliability of the research instrument, the researcher makes sure that participants have only one opportunity to respond to the questionnaire and they know its purpose.

Table 3

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.983	.983	17

3.4. Data collection

To gather data for the current research, the researcher has read the literature to understand the topic and find the available research instruments used to measure teachers' education for sustainable development competencies. After understanding the topic, the current research instrument was designed (for more information, see the research instrument section). After gaining the ethical approval to perform the research, a pilot study was done to ensure the current research instrument's validity, reliability and feasibility. After ensuring the research instrument's validity, reliability and feasibility, WhatsApp text invitation was used as the best way to ensure that the collected responses would be from the targeted population. The WhatsApp text invitation was written and sent by the researcher to GFP teachers at the University of Buraimi. The WhatsApp text included the research topic and objective to achieve the creditability of the research. It further included the study participation invitation and the study's ethical considerations. The study participants were notified that they have complete freedom to participate in the study, and the data that will be collected will be used only for research purposes. They were also notified of their responses' confidentiality and participation's anonymity. After receiving the current research participants' responses, they were saved in Excel format. A total of twenty-three teachers participated in the current study. Twenty questionnaires were taken for the research investigation. Three of them were discarded due to the sloppy completion.

4. Results

The current research data were analyzed by Statistical Package for Social Science (SPSS) software (version 23). Descriptive statistics were utilized to find the mean (M), minimum (Min.), maximum (Max.) and Standard Deviation (SD). This step was done to answer the two current research questions: What education for sustainable development competencies do the GFP teachers at the University of Buraimi have? And what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess?

4.1. Descriptive statistics

4.1.1. Question one: what education for sustainable development competencies do the GFP teachers at the University of Buraimi have?

4.1.1.1. Descriptive statistics of the total ESD competencies, transversal competencies and science education competencies

To answer question one, mean (M), minimum (Min.), maximum (Max.), and Standard Deviation (SD) were calculated. Table 4 shows the results.

Table 4

Descriptive Statistics of the Total ESD Competencies, Transversal Competencies and Science Education Competencies

	N	Minimum	Maximum	Mean	Std. Deviation
ESD Competencies	20	7.00	35.00	29.5000	6.03062
Transversal Competencies	20	6.00	30.00	25.0500	5.56753
Science Education Competencies	20	4.00	20.00	16.3500	3.71731
Valid N (listwise)	20				

Table 4 shows that GFP teachers' ESD competencies (M= 29.50) are higher than transversal competencies (M= 25,05) and science education competencies (M= 16.35), respectively. The table further shows that the result distribution of the ESD competencies (SD= 6.03) is higher than transversal competencies (SD= 5.56) and science education competencies (SD= 3.71), respectively.

4.1.2. Question two: what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess?

4.1.2.1. Descriptive Statistics of the aspects of ESD competencies, transversal competencies and science education competencies

4.1.2.1.1. Descriptive statistics of ESD competencies' aspects

To answer question two, mean (M), maximum (Max.), minimum (Min.), and Standard Deviation (SD) were calculated for ESD competencies' aspects. Results are presented in table 5.

Table 5

Descriptive Statistics of ESD Competencies' Aspects

	N	Minimum	Maximum	Mean	Std. Deviation
I can raise my students' environmental awareness.	20	1.00	5.00	4.3500	.98809
I can foster my students' sense of belonging to the environment.	20	1.00	5.00	4.2500	1.01955
I can help my students to think about different scenarios or alternatives to a situation or problem on a local and global scale.	20	1.00	5.00	4.2500	.96655

I can promote my students' critical analysis of some phenomenon or subject where my students could position themselves to argue for and respect different points of view.	20	1.00	5.00	4.2000	.95145
I can promote my students' ability to act and make decisions.	20	1.00	5.00	4.1500	.93330
I can promote my students' skills to collaborate in socio-educational actions as part of a cooperative community, including the participation of different stakeholders in sustainability.	20	1.00	5.00	4.0000	.91766
I can promote my students' educational values oriented towards responsible and active citizenship.	20	1.00	5.00	4.3000	.92338
Valid N (listwise)	20				

Table 5 shows that GFP teachers are more competent in raising students' environmental awareness (M= 4.3500) and promoting students' educational values oriented towards responsible and active citizenship (M= 4.3000), respectively, than the other ESD competencies' aspects. Furthermore, the table shows that the result distributions of the ESD competencies' aspects, fostering students' sense of belonging to the environment (SD= 1.01955) and raising students' environmental awareness (SD= .98809) are higher than the rest of the ESD competencies' aspects.

4.1.2.1.2. Descriptive statistics of transversal competencies' aspects

To answer question two, mean (M), maximum (Max.), minimum (Min.), and Standard Deviation (SD) were calculated for transversal competencies' aspects. Table 6 shows the results.

Table 6

Descriptive Statistics of Transversal Competencies' Aspects

	N	Minimum	Maximum	Mean	Std. Deviation
I can put an emphasis on intellectual development in my teaching.	20	1.00	5.00	4.4000	.94032

I can develop habits and attitudes toward promoting of healthy lifestyles among my students at the personal and community level.	20	1.00	5.00	4.1000	1.07115
I can promote reflection and individual and collective responsibility among my students.	20	1.00	5.00	4.1500	.98809
I can teach my students to work transversally from different perspectives and areas of a situation or problem and interrelate them.	20	1.00	5.00	4.2000	1.00525
I can help my students to take actions of respecting and valuing the diversity of biological social and cultural issues.	20	1.00	5.00	4.3000	1.03110
I can control my students' projects to be sustainable.	20	1.00	5.00	3.9000	1.02084
Valid N (listwise)	20				

Table 6 shows that GFP teachers are more competent in putting an emphasis on intellectual development in their teaching (M= 4.4000) and helping students to take actions of respecting and valuing the diversity of biological, social and cultural issues (M= 4.3000) respectively than the rest of transversal competencies' aspects. Furthermore, table 6 shows that the result distributions of the transversal competencies' aspects, developing habits and attitudes toward promoting healthy lifestyles among students at the personal and community level (SD= 1.07115) and helping students to take actions of respecting and valuing the diversity of biological social and cultural issues (SD= .98809) respectively are higher than the rest of the transversal competencies' aspects.

4.1.2.1.3. Descriptive statistics of science education competencies' aspects

To answer question two, the mean (M), maximum (Max.), minimum (Min.) and Standard Deviation (SD) of science education competencies' aspects. Results are presented in table 7.

Table 7

Descriptive Statistics of Science Education Competencies' Aspects

	N	Minimum	Maximum	Mean	Std. Deviation
I can explain and interpret a phenomenon scientifically and identify appropriate explanations and predictions for it.	20	1.00	5.00	3.8000	1.05631
I can observe facts and/or phenomena identifying evidence and contrasting data.	20	1.00	5.00	4.0500	.99868
I can analyze the impact of human activities on the environment and suggest improvement actions.	20	1.00	5.00	4.2000	1.05631
I can think about the effects of my behaviours on my country and the world.	20	1.00	5.00	4.3000	.92338
Valid N (listwise)	20				

Table 7 shows that GFP teachers are more competent in thinking about the effects of their behaviors on their countries and the world (M= 4.3000) than analyzing the impact of human activities on the environment and suggesting improvement actions (M= 4.2000), observing facts and/or phenomena identifying evidence and contrasting data (M= 4.0500), and explaining and interpreting a phenomenon scientifically identifying appropriate explanations and predictions for it (M= 3.8000).

5. Discussion

The current research results show that GFP teachers' ESD competencies are higher than their transversal and science education competencies. This result implies that GFP teachers could have knowledge of education for sustainable development, but they need to gain the skills to apply it in personal or educational domains. This result is in a similar vein to Ammoneit, Turek and Peter (2022), who found that teachers had high ESD-related professional competencies. However, they need to be more confident in pedagogical knowledge. This result is also in the same line with Nikolaou (2021), who found that there is a low level of pedagogical approaches to innovation in higher education in Oman.

Results further show that GFP teachers are more competent in raising students' environmental awareness and promoting students' educational values oriented towards responsible and active citizenship respectively than helping students to think about different scenarios or alternatives to a situation or problem on a local and global scale, fostering students sense of belonging to the environment, promoting students' critical analysis of some phenomenon or subject where students could position themselves to argue for and respect different points of view, promoting students' ability to act and make decisions and promoting students' skills to collaborate in socio-educational actions as part of a cooperative community, including the participation of different stakeholders of sustainability. This result suggests that GFP teachers could provide learners with general knowledge of the importance of sustainability, but they could not scaffold their learning. They could provide general guidance on the importance of preserving the environment, but they could not help them to observe, reflect or act on environmental issues. This result could further suggest that GFP teachers could have the ESD content knowledge but not the pedagogical one. This result also suggests that GFP teachers could raise students' awareness of environmental issues in a specific context, but they could not expand that to the world. Therefore, they could develop country citizenship but not the global one. This result is in the same line with Ammoneit, Turek and Peter (2022), who have found that teachers were least confident in pedagogical knowledge. In addition, this result is in accordance with Al-Maamari (2021), who found that educators associated citizenship with patriotism in the teaching process. However, teachers had limited practices which were associated with citizenship education.

Results also show that GFP teachers are more competent in putting an emphasis on intellectual development in their teaching than helping students to reflect on a problem or situation and taking an action to solve the problem or situation respecting and valuing the diversity of biological, social and cultural issues. Results also show that GFP teachers are more competent in putting an emphasis on intellectual development than teaching students how to work transversally from different perspectives and areas of a situation or problem at the personal and community level and having the commitment to test the suggested solutions. The results also show that teachers are less competent in controlling students' projects to be sustainable. This result implies that GFP teachers could help learners theoretically but not practically. This result implies that teachers could have knowledge of environmental issues, and they could develop students' thinking skills. However, they need to gain the skills to connect the learning process with the community as a source of knowledge. Furthermore, this result suggests that GFP teachers could have the skills to develop the thinking skills of students but not in an authentic way. This result is in the same line as Nikolaou (2021), who found significant differences in the level of awareness among logistics faculty members in higher education of the application of education for sustainable development. He found that there is a low level of cooperation with the community in providing placements and internships in higher education. The study implications also showed a low level of awareness among faculty of pedagogical approaches to achieve innovation in higher education. Therefore, there were limited opportunities for putting theories into practice.

In addition, the current research results show that GFP teachers are more competent in thinking about the effects of their behaviours on their countries and the world than analyzing the impact of human activities on the environment and suggesting improvement actions, observing facts and/or phenomena identifying evidence and contrasting data, explaining and interpreting a phenomenon scientifically and identifying appropriate explanations and predictions for it. This result implies that GFP teachers do not have reflective practice skills. They could interact with the environment and its issues. They could contextualize the issues and find the interrelations. However, they need to gain the skills and commitment to analyze the problems, suggest theories, and test these theories in the field. This result is against Maidou, Plakitsi and M. Polatoglou (2019), who found that teachers had knowledge of the environmental aspects of ESD. However, they did not have knowledge of societal and financial matters.

6. Conclusion

The current quantitative research aims to investigate Omani higher education General Foundation Program (GFP) teachers' competencies for education for sustainable development. It aims to answer two questions: What education for sustainable development competencies do the GFP teachers at the University of Buraimi have? And what aspects of education for sustainable development do the GFP teachers at the University of Buraimi possess? Results showed that GFP teachers' ESD competencies are higher than their transversal and science education competencies, respectively. As for ESD competencies' aspects, results showed that GFP teachers are more competent in raising students' environmental awareness and promoting their educational values oriented towards responsible and active citizenship respectively than the other aspects of ESD competencies. Results showed that helping students to think about different scenarios or alternatives to a situation or problem on a local and global scale, fostering students' sense of belonging to the environment, promoting students' critical analysis of some phenomenon or subject where students could position themselves to argue for and respect different points of view, promoting students' ability to act and make decisions and promoting their skills to collaborate in socio-educational actions as part of a cooperative community, including the participation of different stakeholders of sustainability are some ESD aspects which were less competent by GFP teachers. Regarding transversal competencies' aspects, results showed that GFP teachers are more competent in putting an emphasis on intellectual development in their teaching than helping students to reflect and take actions respecting and valuing the diversity of biological, social and cultural issues. Results showed that GFP teachers are less competent in teaching students to work transversally from different perspectives and areas of a situation or problem and interrelating them, promoting reflection individual and collective responsibility among students, developing habits and attitudes to the promotion of healthy lifestyles among them at the personal and community level and controlling students' projects to be sustainable respectively. As for science education competencies' aspects, results showed that GFP teachers are more competent in thinking about the effects of their behaviors on their countries and the world. Results showed that analyzing the impact of human activities on the environment and suggesting improvement actions, observing facts and/or phenomena identifying evidence and contrasting data, explaining and interpreting a phenomenon scientifically and identifying appropriate explanations and predictions for it were the aspects which were less competent by GFP teachers. Notwithstanding this research discussed Omani higher education General Foundation Program (GFP) teachers' competencies for education for sustainable development, results cannot be generalized. Results were done on a small number of participants. Being not doing the research using a mixed method research design, the current research has a limitation. Conducting observations or interviews could expand the understanding of the results. Future research studies could duplicate the current research in other contexts. Future studies could investigate teachers' competencies of education for sustainable development in the ministry of education. Future studies could also investigate the self-efficacy of teachers and students in applying education for sustainable development. They could investigate the teachers' competencies in assessing education for sustainable development. They could investigate the interface between teachers' competencies, reflective practice and self-efficacy. The current research recommends all the stakeholders of the educational field to develop the knowledge, skills and values of education for sustainable development. All teachers must have them to facilitate students' learning and have a profound transformation of education. The current research further recommends all professional programs' directors, locally or globally, to activate the practices of reflective practice. It is a tool for producing authentic teaching and learning. Therefore, education could enhance the sustainable practices of sustainable societies.

List of abbreviations

N	Abbreviation	Meaning
1.	CELTA	Cambridge Certificate in English Language Teaching to Adults
2.	ESD	Education for Sustainable Development
3.	ESP	English
4.	GFP	General Foundation Program
5.	IT	Information Technology
6.	M	Mean
7.	Max.	Maximum
8.	Min.	Minimum
9.	N	Number
10.	SD	Standard Deviation
11.	SD.	Sustainable Development
12.	SPSS	Statistical Package for Social Science
13.	TESOL	Teaching English to Speakers of Other Languages
14.	UNESCO	United Nations Educational, Scientific and Cultural Organization
15.	WCED	World Commission on Environment and Development

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Incidence of Systematic Explicit Instruction of Metacognitive Reading Strategies on Students' Academic Achievement

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This project aims at researching on the effectiveness of explicit instruction of metacognitive reading strategies on tests taken to 20-30-year-old university students from Orán, a city in the north-west of Salta, in Argentina, whose native language is Spanish. It explores the field of language teaching and learning seen from the cognitive perspective. It is a qualitative-quantitative, process-oriented, small-scale, subjective, phenomenologist, and quasi-experimental, prospective action research work with controlled intervention focused on making students aware of the metacognitive strategies needed to be able to comprehend field-based expository text types. It is meant to help them improve their ability to deal with definitions, descriptions, classifications, narrations, instructions and arguments by putting metacognitive strategies into practice. In 2022, both the control and the experimental group attended a compulsory reading comprehension course in L2, English, in the 4th year of the Nursing Training Bachelor Studies offered by the School of Health Sciences at the National University of Salta. Only the experimental group received instruction regarding metacognition. The data collected included students' level of English, general reading comprehension level (based on the CEFR, 2020), metacognitive awareness of reading strategies before the period of instruction and after the practice tests taken, scores compared out of ten practice tests on different text types, metacognitive strategies put into practice while doing each practice test, frequency of use of each metacognitive strategy. Based on the qualitative and quantitative information collected from the experimental group, the teacher will interpret the results to assess academic achievement.

Keywords: Metacognition, Reading Strategies, Field-Content Based Texts, Expository Text-Types, Effectiveness, Academic Achievement

1. Introduction

Meichenbaum (1985, p 1) states that *"*Metacognition refers to awareness of one's own knowledge—what one does and doesn't know—and one's ability to understand, control, and manipulate one's cognitive processes*"*. In the reading process, Anderson (2005, p. 359) defines it as a process that "concerns with learners' knowledge and their own cognitive resources, which involve behaviors such as predicting, self-questioning, paraphrasing, summarizing, re-reading to clarify meaning…"

This project aims at raising students' awareness on metacognitive knowledge by explicitly showing them what strategies they can put into practice to get meaning successfully when reading field content-based written texts in English (L2) at university during the instruction period of a compulsory reading comprehension course in the Nursing career offered by the School of Health of the Sede Regional Orán. For the purpose of this study, it is worthwhile noticing the difference between cognition and metacognition.

The former refers to basic mental abilities we use to think which include resorting to schemata (using background knowledge), recalling information from memory, making associations, comparing/contrasting different pieces of information, making inferences, and using text clues among others. The latter makes reference to behaviors undertaken by learners to plan how to approach a task using appropriate cognitive strategies to get meaning, and to monitor the process in order to solve a problem, self-assess, self-correct, evaluate progress towards completion of a task, become aware of distracting stimuli among others. To make it shorter, it has to do with thinking about one's own learning process. In this project, thinking about thinking refers to students' thinking about their own reading process. Thus, they will be able to select or discard the right cognitive tools to accomplish the required task. Fountas and Pinnell (2000) state that: “metacognition literally means “big thinking”. You are thinking about thinking”.

2. Relevance in the field

Metacognition awareness when reading for comprehension in L2 is significant as it is a process that allows readers to think about their own reading process every time they are exposed to actual instances of field-based written texts in L2. By being cognizant of cognitive strategies, and about metacognition students can build knowledge to monitor their reading process and use specific strategies to get meaning and/or solve lack of understanding.

Based on the instructor's teaching experience at the university with students who attend compulsory reading comprehension courses, cognitive monitoring while reading for comprehension in a foreign language (L2) has been an issue not commonly found among them. Students' ability to self-control and regulate their comprehension process is most of the time taken for granted as it is wrongly assumed they have already got metacognitive reading strategies when reading texts in their mother tongue, Spanish (L1). On the basis of experience and on the results obtained in the practice tests taken, it has been observed students' limited ability to interpret texts in L2, presumably, because of their lack of knowledge about metacognitive reading strategies. The hindrance observed reflected in the low scores students got in their reading comprehension tests indicated the need to intervene during instruction in a systematic explicit way to raise awareness on what cognitive strategies they can resort to in the reading process and to show them explicitly how metacognition works in the three moments of the reading process.

The limited ability observed in reading comprehension tests indicates the need to intervene during instruction in a systematic explicit way to show students what metacognitive strategies to use when reading for comprehension.

Fountas and Pinell (2000) refer to teachers' intervention in the following citation.

> “Teachers work to guide students to become more strategic thinkers by helping them understand the way they are processing information. Questioning, visualizing, and synthesizing information are all ways that readers can examine their thinking process. Through scaffolding and reciprocal teaching, students are able to practice the skills that lead to these overt acts becoming automatic”

Having identified this problem, a question arises:

Can students who attend a reading comprehension course in L2 at the Sede Regional Orán of the National University of Salta, get better academic achievement when reading field-based texts if they receive explicit instruction on metacognitive strategies?

This project is going to explore the field of language teaching and learning seen from the cognitive perspective. It is going to focus on making students aware of the metacognitive strategies needed to be able to comprehend text types they are made to read while attending the compulsory reading comprehension course at university. It is meant to help them improve their ability to deal with definitions, descriptions, classifications, narrations, instructions and arguments (if possible) in L2 by putting the strategies mentioned into practice.

The teaching experience has shown that there is a growing lack of concern among non-native readers of texts written in English about their ability to self-monitor their reading process to be able to get meaning successfully when reading for comprehension. Fortunately, there seems to be enough evidence to be confident that strategy instruction can, indeed, be effective at helping students be successful readers, Muñiz-Swicegood, 1994; Chamot, Barnhardt, El-Dinary, & Robbins, 1996; Oxford & Leaver, 1996; Cohen, Weaver, & Li, 1998, p. 274. as well as O'Malley et al. (1985, p. 6) who have pointed out that "students without metacognitive approaches are essentially learners without direction or opportunity to review their progress, accomplishments, and future directions".

It is important to mention that readers' metacognitive knowledge in relation to the reading process may be influenced by a number of factors, including previous experiences and, in the case of non-native readers, proficiency in L2.

3. Theoretical framework and literature review

Reading comprehension courses in L2 at the Sede Regional Orán of the National University of Salta adhere to the concept of the reading skill as an interactive cognitive process in which readers interact with a text and the context. In order to get meaning, they are supposed to use cognitive strategies such as "*learning techniques, behaviors, problem-solving strategies or study skills which make learning more effective and efficient"* (Oxford and Crookall, 1989, p. 1).

When teaching reading at university, the teaching process is guided by theories such as **the Schema Theory** (Bartlett, 1932) and K. Goodman and W. Kintsch and T. Van Dijk (1983) with the **Interactive Model** which later on, in 1988, Kintsch extended into the so-called **Construction-Integration Model** (CI). Some other approaches are the **bottom-up** processing (Gough, 1972; Rayner and Pollatsek, 1989), **the top-down processing** (Goodman, 1975; Smith, 1971) and the **interactive models** (Rumelhart, 1977; Stanovich. 1980). **Constructivism**, inspired in cognitive psychology, is another paradigm this subject adheres to with Ausubel and Gagne as their main representatives.

Recent research has put attention on the study of metacognition, that is the study of behaviors (knowing when, where and how to use strategies) undertaken by learners to evaluate and self-monitor their own reading comprehension process - what students can do to solve problems while reading for comprehension. On a general level, metacognition includes awareness and control of planning how to approach the reading task, monitoring it, monitoring one's own comprehension of texts, using fix-up strategies to solve problems, revising, self-assessing and self-correcting, evaluating progress towards the completion of a task, summarizing and evaluating, and becoming aware of distracting stimuli.

Many researchers agree that awareness and monitoring of one's comprehension processes are critically important aspects of skilled reading. Bransford, Brown, & Cocking (2000, p. 4) agree on the fact that *in order for students to notice their errors and then repair mistakes, they must reflect on their performance*. Similar views about metacognition are shared among different authors and researchers. Wade, Trathen, & Schraw (1990, p.1) emphasized the idea that "readers' reflections show how they plan, monitor, evaluate, and use information available to them as they make sense of what they read". Such reflections unveil judgements about the readers' thinking process that serve as descriptions of their metacognitive process while reading. Among other researchers who support teaching metacognition are Pressley & Afflerbach (1995); Brown, (1992); Carrell, (1989); Olshavsky, (1976-1977) who, in general terms say that learners who lack metacognitive approaches are those who have no direction or opportunity to reassess their progress, achievements and potential direction. Paris, Cross and Lipson (1984, p. 10) believe that readers will not adopt and use actions as reading strategies if they do not understand the value or reason for doing so.

Some researchers have a word about the necessity of teaching metacognitive strategies. Cohen (1998); Ellis & Sinclair (1989, p. 9) state that *"*strategy training is defined as the explicit teaching of how, when, and why students should employ language-learning strategies to enhance their efforts at reading language program goals". Therefore, as Akkakoson (2012, p 2) says *"*there is a need for teachers to provide effective explicit self-monitoring strategies in the three stages of the reading process for students to be aware of and develop better reading achievement*"*. Carrell (1998, p. 2) states that to achieve resourceful comprehension, reading strategies should be augmented in the classroom to guide the students to become competent readers".

Metacognitive strategies can be taught" (Halpern, 1996, p. 2) and they are associated with successful learning" (Borkowski, Carr & Pressley, 1987).

4. Description and implementation of the project

This is a quali-quantitative, process-oriented, small scale, subjective, phenomenologist, and quasi-experimental, prospective action research work with controlled intervention. It is also a focused descriptive study as it will systematically describe an area of interest and it will concentrate on determining if two phenomena are related: explicit instruction on metacognition and academic achievement when reading for comprehension. It is also interventionist as it aims at improving one aspect of learning a foreign language, the reading comprehension skill. It is also an exploratory, inductive, process oriented study that will make use of real data.

5. Methodology

To start with, students were randomly divided into two groups in order to avoid biasing: the experimental group and the control group. They had to complete a survey to determine their general level of English. During the four-month period of instruction, students were made to read field-specific texts of around 200-250 words in English (L2), received theoretical lexico-grammatical and discourse instruction during a two-hour class. Individual practice tests were also taken. The oral language used is students' native language, Spanish, whereas the language used in the written texts is English.

During approximately the first two months of instruction and evaluation, students did not receive any systematic instruction on metacognition. During the last two months, they received deliberate systematic instruction on metacognition which they put into practice when doing weekly practice tests. These evaluations are designed by the teacher-researcher based on Ausubel's constructivist view and on the psycholinguistic theories mentioned in the introduction. These tests are continuous and cyclical and they are based on the text-types the course focuses on: expository texts that include definitions, descriptions, classifications and narrations and also, instructions and arguments. Feedback on the results obtained were provided.

It is the aim of the project to research whether students can get better academic results when reading for comprehension if they become more skilled at using metacognitive strategies.

5.1 Procedure and data collection

To carry out this study, the following steps were taken at the beginning of the period of instruction:

- A survey on the students' level of English and their experience with their learning experience (Appendix 1).
- Survey on students' level of overall reading comprehension according to the CEFR (2020). (Appendix 2)
- A survey on metacognition in the reading process (Appendix 3 and 4)). To design the survey, different survey models were consulted, among them Fogarty (1994, p.2) who suggests a planning, monitoring and evaluating phase, the Metacognitive Awareness of Reading Strategies Inventory (MARSI) (Mokhtari, K. and Reichard, C. (2002), Kelley & Clausen--Grace, (2013, p.51-52) The Metacognitive Teaching Framework (MTF) and the Survey of Reading Strategies (SORS), developed by Mokhtari and Sheorey (2002). Items were also added based on my own experience and considering the three different reading moments: pre-reading, while reading and posts reading.

During the first two months of the course, the experimental group received no intervention from the teacher regarding metacognition in any of the three different phases of the reading process as suggested by Presley and Gaskins (2006, p.100): before, while and after reading. The first five practice tests were taken to both groups, control and experimental, and the results collected in percentages, considering 60% a passing mark.
Before the last five practice papers, the teacher worked with the control group and the experimental group in different ways:

Experimental group: The instructor explicitly role modelled metacognitive strategies during the three reading moments. She showed students how to put them into practice in order to show them, for example, how to self-monitor and repair comprehension breakdowns, resort to background knowledge connecting it to what the text says, infer meanings, work on and discard hypotheses among other strategies until meaning made sense. She did this in the top-down and/or bottom-up fashion taking pieces of a given text following Presley and Gaskins (2006, p.100).

After the last five practice tests, students were made to answer a survey about which metacognitive strategies they put into practice during the three reading moments when doing each test (Appendix 4).

Every two practice tests, students were given a questionnaire to inquire about the frequency each strategy is used (Appendix 5). Based on the information collected, the teacher will make a qualitative interpretation in relation to the strategies that are **most used, sometimes used and least used**.

Control group: They were not instructed on metacognitive reading strategies. Students did the practice tests of which percentages were collected, considering 60% a passing mark. Each group did practice tests 6 to 10 on the same day but at different times.

6. Data analysis and interpretation

Data was collected during the instruction period in 2022. Both quantitative and qualitative data are going to be interpreted during 2023.

6.1. Quantitative analysis

Marks/scores (in percentages) from the tests the experimental group made are going to be gathered in order to make a parametric test of statistical significance.

6.2. Qualitative analysis

Information from the surveys and questionnaires will be characterized with graphics, charts and mode.

7. Results and conclusions

This project seeks to explore whether awareness and automaticity in relation to the use of metacognitive reading strategies when reading for comprehension field-content-based texts in L2 will improve students' academic achievement. It is expected that the students from the experimental group perform significantly better allowing them to get meaning successfully. This assumption was supported by different authors who claim that

> The integration of the metacognitive awareness into the classroom reading instruction has been found to be very useful in helping struggling students become more proficient readers and achieving significant gains in reading comprehension" (Alfassi, 2004: Blosk & Pressley, 2002).

This project also aims at determining which strategies are the most, sometimes and least used, so after making a proper quali-quantitative analysis, results, discussions and implications and will be shared.

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APPENDICES

Each survey was designed in a Google form format.

Appendix 1

Survey on students' level of English and about their learning experience

Answer the following questions in relation to your own experience regarding learning English as a foreign language and your level of English today. You can choose more than one option

1-What is your experience in relation to the English language?

a- I've never studied English
b- I studied another language (French, Italian, Portuguese)
c- I studied English in high school
d- I studied English in a private institution

2- What is your level of English today?

a- Basic

b- Intermediate

c- Advanced

3- Do you feel the necessity to learn a foreign language?

a- YES

b- NO

Why? (Justify your answer from question 3)

……………………………………………………………………………………………

4- Have you ever read texts written in English?

a- YES

b- NO

5- Do you yourself consider a good reader?

a-YES

b-NO

Why? (Justify your answer from question 5)

……………………………………………………………………………………………….

6- Do you think there are strategies that can help you improve the reading comprehension skill when reading a text written in English?

a- YES

b- NO

Which? (Justify your answer from question 6)

…………………………………………………………………………………………………

7- Do you think a translating machine is the only way to understand a text written in a foreign language?

a- YES

b- NO

Why? (Justify your answer from question 7)

………………………………………………………………………………………………..

8- What are your personal expectations around the subject you are attending. You can choose more than one option,

- Pass the subject
- Broaden the knowledge of the language to be able to understand a text written in English
- Acquire strategies to be able to understand a text written in English
- I'm not interested in understanding a text written in a foreign language

9- Which do you think are your major difficulties at the moment of reading a text in a foreign language?

- Grammar
- Vocabulary
- Text types

10- Do you think you can monitor your own reading process of a text written in a foreign language?

a- YES

b- NO

If you chose "YES" answer this question: How do you monitor your own reading process?

…………………………………………………………………………………………………

Appendix 2

Survey on students' level of overall reading comprehension according to CEFR (2020).

OVERALL READING COMPREHENSION LEVEL

CHOOSE THE OPTIONS ACCORDING TO YOUR LEVEL OF ENGLISH TODAY

1- I can recognize familiar words/signs accompanied by pictures, such as a fast-food restaurant menu illustrated with photos or a picture book using familiar vocabulary. (PRE-A1)

2- I can understand very short, simple texts a single phrase at a time, picking up familiar names, words and basic phrases and rereading as required. (A1)

3- I can understand short, simple texts containing the highest frequency vocabulary, including a proportion of shared international vocabulary items. (A2)

4- I can understand short, simple texts on familiar matters of a concrete type which consist of high frequency every day or job-related language. (A2+)

5- I can read straightforward factual texts on subjects related to their field of interest with a satisfactory level of comprehension. (B1)

6- I can read with a large degree of independence, adapting style and speed of reading to different texts and purposes, and using appropriate reference sources selectively. Has a broad active reading vocabulary, but may experience some difficulty with low-frequency idioms. (B2)

7- I can understand in detail lengthy, complex texts, whether or not these relate to their own area of speciality, provided they can reread difficult sections. (C1)

8- I can understand a wide variety of texts including literary writings, newspaper or magazine articles, and specialized academic or professional publications, provided there are opportunities for rereading and they have access to reference tools. (C1)

9- I can understand a wide range of long and complex texts, appreciating subtle distinctions of style and implicit as well as explicit meaning. (C2)

10- I can understand virtually all types of texts including abstract, structurally complex, or highly colloquial literary and non-literary writings. (C2)

Appendix 3 and 4

Survey on the metacognitive strategies students resort to, or not, before the period of instruction.
The same survey had to be answered after the practice tests.

PRE-READING STRATEGIES

What strategies do you put into practice during the pre-reading moment? For each item, choose YES or NO.

1. I have a reading purpose in mind (to interpret; not to translate).
   YES NO
2. I know how much time I have to complete the task.
   YES NO
3. I preview the text to see what it’s about before reading it.
   YES NO
4. I skim the text first by noting characteristics like length and organization.
   YES NO
5. I observe the text structure
   YES NO
6. I can identify context clues that help me understand (known and transparent words).
   YES NO
7. I observe the paratext (everything that goes with the text).
   YES NO
8. I observe the text and its different parts to activate previous knowledge.
   YES NO
9. I can make predictions about what the text is about in its different parts/sections.

YES NO

10. I ask myself questions about the topic to check comprehension.

YES NO

11. I think about what I know to help me understand what I read.

YES NO

WHILE READING STRATEGIES

a- I decide what to read and what not to read
YES NO

b- I read slowly but carefully to be sure I understand what I'm reading
YES NO

c- I use a graphic organizer to help me understand
YES NO

d- I highlight, underline, circle and /or take notes to increase my understanding
YES NO

e- I can infer the meaning of a word without looking it up in a dictionary
YES NO

f- When the text turns difficult to read, I go back and forth
YES NO

g- If I do not understand, I give up the idea I'm trying to elaborate
YES NO

h- If the context clues do not help me, I read the part of the text I'm trying to understand again
YES NO

i- If I cannot make conceptual associations with the new information, I observe/read again
YES NO

j- I analyze and assess the new information critically (does it make sense?)
YES NO

k- I discard hypotheses and elaborate the concept again.
YES NO

l- I associate the content of a proposition with another one.
YES NO

m- If I cannot associate two propositions, I observe/read again till the concept makes sense
YES NO

n- When I loose concentration, I give up
YES NO

o- When I lose track, I take a rest and start again
YES NO

p- When the topic is difficult to understand, I read again paying closer attention.
YES NO

q- If the text is difficult to read, I read as many times as necessary
YES NO

r- I read too fast
YES NO

s- If I read quickly, I try to read more slowly.
YES NO

t- I adjust my reading speed according to what I'm reading.
YES NO

u- I stop from time to time and think about what I'm reading.
YES NO

v- If I cannot infer the meaning of a word, I use reference materials such as dictionaries to help me understand what I read.
YES NO

w- If I have grammar problems, I try to infer the global meaning of the sentence.

YES NO

x- I summarize what I read to reflect on important information in the text.
YES NO

y- I discuss what I read with others to check my understanding
YES NO

z- I paraphrase (restate ideas in my own words) to better understand what I read.
YES NO

POST-READING STRATEGIES

a. I think of possible reasons that hindered understanding
YES NO

b. I try to identify possible strategies that helped me understand

YES NO

c. I change my reading strategies because I could not comply with the task required

YES NO

d. I put into practice strategies that permitted understanding again

YES NO

Appendix 5

Survey on frequency of metacognitive reading strategies after the last five practice tests.
For each item, choose the option that best suits the frequency with which you put each strategy into practice

1 means “never”
2 means “occasionally “
3 means “sometimes”
4 means “usually”
5 means “always”

STRATEGIES	**SCALE**				
PRE-READING STRATEGIES 1. I have a reading purpose in mind (to interpret; not to translate) 2. I know how much time I have to complete the task 3. I preview the text to see what it’s about before reading it. 4. 4. I skim the text first by noting characteristics like length and organization. 5. I observe the text structure. 6. I can identify context clues that help me understand (known and transparent words). 7. I observe the paratext (everything that accompanies with the text). 8. I observe the text and its different parts to activate previous knowledge. 9. I can make predictions about what the text is about in its different parts/sections. 10. I ask myself questions about the topic to check comprehension. 11. I think about what I know to help me understand what I read.	**1**	**2**	**3**	**4**	**5**

WHILE READING STRATEGIES					
a- I decide what to read and what not to read.					
b- I read slowly but carefully to be sure I understand what I'm reading					
c- I use a graphic organizer to help me understand.					
d- I highlight, underline, circle and /or take notes to increase my understanding.					
e- I can infer the meaning of a word without looking it up in a dictionary.					
f- When the text turns difficult to read, I go back and forth.					
g- If I do not understand, I give up the idea I'm trying to elaborate.					
h- If the context clues do not help me, I read the part of the text I'm trying to understand again.					
i. If I cannot make conceptual associations with the new information, I observe/read again.					
j. I analyze and assess the new information critically (does it make sense?).					
k. I discard hypotheses and elaborate the concept again.					
l. I associate the content of a proposition with another one.					
m. If I cannot associate two propositions, I observe/read again till the concept makes sense.					
n. When I loose concentration, I give up.					
o. When I lose track, I take a rest and start again.					
p. When the topic is difficult to understand, I read again paying closer attention.					
q. If the text is difficult to read, I read as many times as necessary.					
r. I read too fast.					
s. If I read quickly, I try to read more slowly.					
t. I adjust my reading speed according to what I'm reading.					
u. I stop from time to time and think about what I'm reading.					
v. If I cannot infer the meaning of a word, I use reference materials such as dictionaries to help me understand what I read.					
w. If I have grammar problems, I try to infer the global meaning of the sentence.					
x. I summarize what I read to reflect on important information in the text.					
y. I discuss what I read with others to check my understanding					
z. I paraphrase (restate ideas in my own words) to better understand what I read.					

POST-READING STRATEGIES 1. I think of possible reasons that hindered understanding 2. I try to identify possible strategies that helped me understand. 3. I change my reading strategies because I could not comply with the task required. 4. I put into practice strategies that permitted understanding again.					.

Appendix 6

Charts for Final Report 2023

Scores got by the control and the experimental groups will be compared (CG: control group; EXP G: Experimental group)

Level of achievement

PRACTICE TESTS	
PRACTICE TESTS	**Scores (in percentages)** **CONTROL GROUP** **No interv, on metacog** **Scores (in percentages)** **EXPERIMENTAL. GROUP** **Intervention on metacognition from test 5 to 10**
Practice test 1	
Practice test 2	
Practice test 3	
Practice test 4	
Practice test 5	
Practice test 6	
Practice test 7	
Practice test 8	
Practice test 9	

Practice test 10	

Appendix 7

Chart for final report 2023

Metacognitive strategies frequency of use

STRATEGIES		
Most used	**Sometimes used**	**Least used**

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